Engineering Report for the Production, Distribution and Use of Recycled/Reused Water

Southern Region Tertiary Treatment Plant

Marine Corps Base Camp Pendleton

NAVFAC Naval Facilities Engineering Command SOUTHWEST DIVISION

CDM

Camp Pendleton
Engineering Report for the Production, Distribution and Use of Recycled/Reused Water
Southern Region Tertiary Treatment Plant
Marine Corps Base Camp Pendleton

1.0 INTRODUCTION

The purpose of this document is to provide the Regional Water Control Board (RWQCB), San Diego, and the California Department of Public Health (CDPH) with the necessary information concerning design, operation, and the tertiary treated wastewater recycling system for the Southern Region Tertiary Treatment Plant (SRTTP) at Marine Corps Base Camp Pendleton (MCBCP) to obtain a Master Reclamation Permit.

Currently the SRTTP is fully operational and the tertiary treated wastewater, after combining with the secondary treated wastewater from sewage treatment plants 1, 2, and 3 at the Lemon Grove Pump Station, is discharged to the Oceanside Ocean Outfall (OOO) under NPDES permit CA0109347. Since November 2006, the SRTTP has been tertiary treating only the flows previously going to STP 13 which is about 1 to1.5 million gallon per day (mgd). However, in the Summer of 2008, construction will be completed to convert sewage treatment plants (STPs) 1, 2, and 3 to Tributary Area Pump Stations (TAPS). Along with the TAPS, the installation of piping to divert flows from STPs 1, 2 and 3 to the SRTTP for tertiary treatment will also be completed. New piping will also be installed to convey reclaimed water to recycle/reuse areas (See Figure 1-1). With the issuance of a Master Reclamation Permit, the tertiary treated wastewater generated in the southern part of MCBCP will be reused using the new distribution system. This Engineering Report is for the Master Reclamation Permit which is to recycle and reuse as much tertiary treated wastewater generated in the southern part of MCBCP as practically feasible. This flow rate can be up to 2.7 mgd, eventually increasing to as much as 3.75 mgd.

1.1 Requirement of Engineering Report Submittal

The current State of California Water Recycling Criteria (adopted in December 2000) requires the submission of an Engineering Report to the RWQCB and the CDPH before recycled/reused water projects are implemented. The purpose of an Engineering Report is to describe the manner by which a project will comply with the Water Recycling Criteria. The Water Recycling Criteria are contained in Sections

60301 through 60355, inclusive, of the California Code of Regulations, Title 22. The Criteria prescribe:

- Recycled/reused water quality and wastewater treatment requirements for the various types of allowed uses,
- Use area requirements pertaining to the actual location of use of the recycled/reused water (including dual plumbed facilities), and
- Reliability features required in the treatment facilities to ensure safe performance.

Section 60323 of the Water Recycling Criteria specifies that the Engineering Report be prepared by a qualified engineer, registered in California and experienced in the field of wastewater treatment.

Reclamation Master Permit requirements can be found in Section 13523.1 of the California Water Code. This Engineering Report describes how the SRTTP complies with the Water Recycling Criteria.

1.2 Agencies Involved

The current State of California Water Recycling Criteria (adopted in December 2000) requires the submission of an engineering report to the RWQCB and CDPH before recycled/reused water projects are implemented. The MCBCP is the owner and operator of all the treatment and distribution facilities.

1.3 Construction of the SRTTP, Conveyance and the Recycle/Reuse Pipelines

SRTTP

The SRTTP has been in operation since November 2006. At that time only wastewater previously going to STP 13 was diverted to the SRTTP. Since then, STP 13 has not been in operation and has been abandoned. The wastewater previously going to STP 13 now is diverted at a manhole just upstream of STP 13 Headworks. The wastewater flows through a new 36-inch sewer line with an influent flow meter installed before entering the SRTTP. The existing oil/water separator upstream of STP-13 remains in service and now feeds through the new 36-inch sewer line to the SRTTP. The flow receives preliminary treatment through mechanical bar screens located on the northeast corner of the SRTTP. The mechanical bar screen automatically removes screenings. A washer compactor cleans and disposes of the screenings into a dumpster. A second manual screen is provided in case the mechanical bar screen malfunctions.

After screening, the flow enters the Influent Pump Station (IPS) also located in the northeast corner of the SRTTP.

Influent Pump Station and Grit Removal Facilities

At the IPS, the flow is lifted to the hydraulic elevation of the SRTTP. The pump station consists of a self cleaning wet well and a dry well with submersible pumps. Two sizes of pumps with variable speed control allow the pump station to match the variations in the influent flow from a minimum of 0.5 mgd to a peak hydraulic flow of 15 mgd. The flow from the pump station passes through a magnetic flow metering station that serves as the recycle flow meter. After the metering station the wastewater flows to two vortexing Grit Collectors (basins) to remove grit and sand from the flow. The purpose of the Grit Collectors (basins) is to protect the downstream processes from sand abrasion and sand build-up. Grit removed from the Grit Collectors (basins) is pumped to cyclones and classifiers and discharged to dumpsters. See Table 1-1 for more details on the IPS.

Table 1-1
Influent Pump Station

Influent Wastewater Flow Rate (Peak Hourly Wet Weather Flow)	15 mgd
Facility Type	Wet & Dry Pit
Wet Volume (Operating)	5,385 gallons
Number of Lead Pumps	2
Number of Lag Pumps	2
Capacities: Duty Pumps Standby Pumps	 5,250 gpm (7.5 mgd) 1,400 gpm (2.0 mgd)
Total Dynamic Head	30 ft
Pump Type	Centrifugal, dry-pit submersible
Drive	Variable Frequency Drive & Soft Start Fixed Speed

Secondary Treatment

The wastewater flow from the Grit Collectors (basins), now free from floatables removed by the influent screens and debris and sand removed by the Grit Collectors (basins), flows by gravity to the sequencing batch reactor (SBR). The SBR influent pipe features a self flushing design. Once in the SBR, the flow receives secondary treatment and nutrient removal designed to minimize nitrogen and phosphorus. The SBR consists of five basins (three 100 foot by 100 foot square basins and two 49 foot by 100 foot basins). All of the basins are 26 feet deep. The design is modular and allows efficient treatment over large variation of flows. The SBR is a batch process, and flow is directed to one tank at a time. Each tank provides a sequence of anoxic, aerobic, and clarification treatment steps.

Tertiary Treatment

The Equalization Basins allow a more efficient design of the tertiary treatment train. The equalization basins are equipped with three filter feed pumps complete with variable frequency drives. The pumps transfer the flow to disk filters with cloth filter media. The wastewater and reclaimed water systems use technologies accepted by the CDPH, Division of Drinking Water and Environmental Management, for Title 22 water recycling, as documented in their publication "Treatment Technology Report

for Recycled Water." Three disk filter basins are provided, two duty and one standby (See Figures 1-2 and 1-3, otherwise known as Record Drawings 4-S-21 and 4-S-22). From the disk filters the water is pumped to the Disinfectant Contact Basins. An onsite generation system can generate hypochlorite solution used for disinfecting the flow entering the chlorine contact basins, as needed. There are two Chlorine Contact Basins designed to handle the maximum daily flows (See Figures 1-4 and 1-5, otherwise known as Record Drawings 4-S-32 and 4-S-33). Until STPs 1, 2, and 3 are connected to the SRTTP, only one basin is needed.

In the future the SRTTP flow can be pumped directly from the Chlorine Contact Basin discharge box to the new recycle water distribution system. The water from Lemon Grove Ponds will be pumped to the Chlorine Contact Basin if the turbidity is below 2 NTU; if not, then it will be pumped to the SRTTP headworks for re-treatment. After the chlorine contact basins, the flow then discharges to Lemon Grove Pump Station to pump the tertiary treated wastewater to the OOO or to the reclaimed system.

By summer of 2008, the tertiary treated wastewater from the SRTTP will be recycled/reused to the extent practicable.

Solids Handling and Disposal

The sludge stream treatment consists of aerobic digestion gravity thickening and belt press dewatering. Submersible pumps in the SBR pump the waste activated sludge from the SBR to the two aerobic digesters. The digesters are designed to stabilize the sludge through the use of surface aerators. Each digester is equipped with a surface aerator and a decanting mechanism to thicken the sludge. Positive displacement pumps pump the digested sludge to sludge thickening and dewatering facilities. These facilities consist of a gravity belt thickener used as a back-up for the decanters on the digesters and two dewatering belt filter presses.

Dewatered solids are conveyed by a belt conveyor to a trailer located outdoors. The dewatered solids are hauled to STP 13's sand drying beds for further drying, before being hauled to an approved landfill off Base. Depending on the copper concentration of the sludge, the sludge may need to be hauled to an off-site hazardous waste landfill after further drying in the existing sludge drying beds. The digesters are uncovered and located outdoors on the northwest perimeter of the SRTTP site. The gravity belt thickeners (GBTs) and the belt filter presses (BFPs) are housed in an enclosed solids handling room in the Operations Building on the north perimeter of the site. Emissions from the solids handling room are routed to the biofilter.

Odor Control

Odor Control at the SRTTP is be achieved by a biofilter. Foul air from the IPS, the screening channels, the grit collector and the sludge processing room are routed to the biofilter to receive natural biological removal of the odors through a bed of wood chip and compost filter media. The biofilter is located in the northeast corner of the SRTTP.

Operations and Control Building

The Operations Building located on the north side of the SRTTP houses the sludge thickening and dewatering facilities in the Solids Handling Room, motor control centers in the MCC Room and the aeration blowers for the SBR in the Blower Room.

The Control Building on the east side of the SRTTP houses the offices, the laboratory, locker rooms, and the control room as well as MCCs for the tertiary treatment portion of the SRTTP.

Reclaimed Water/Effluent Pump Station

In the summer of 2008, the effluent pump station will convey treated effluent to the MCBCP reclaimed water distribution system, or as needed, to the OOO.

The reclaimed water pump station will consist of three vertical turbine pumps (two duty, one standby) to transfer treated water to the reclaimed water distribution and storage systems. Any "off-spec" water can be stored in an existing storage tank near the SRTTP site for subsequent re-treatment. Under emergency operating conditions, during start-up operations, and until the reclaimed system is operational, the SRTTP will discharge treated effluent to the OOO. Thus, tertiary treated effluent will initially be discharged to the OOO via the existing LGP pump station. Excess water will be stored in LGP. After the reclaimed system is operational, there will be 3 options for the tertiary treated water; 1) from the SRTTP to the OOO, 2) to both the OOO and the LGP, and 3); from the SRTTP to the LGP back to the SRTTP, then to the Reclaimed Water system.

1.4 Description of Legal Arrangements With Respect to Treatment, Distribution and Use of Recycled Water

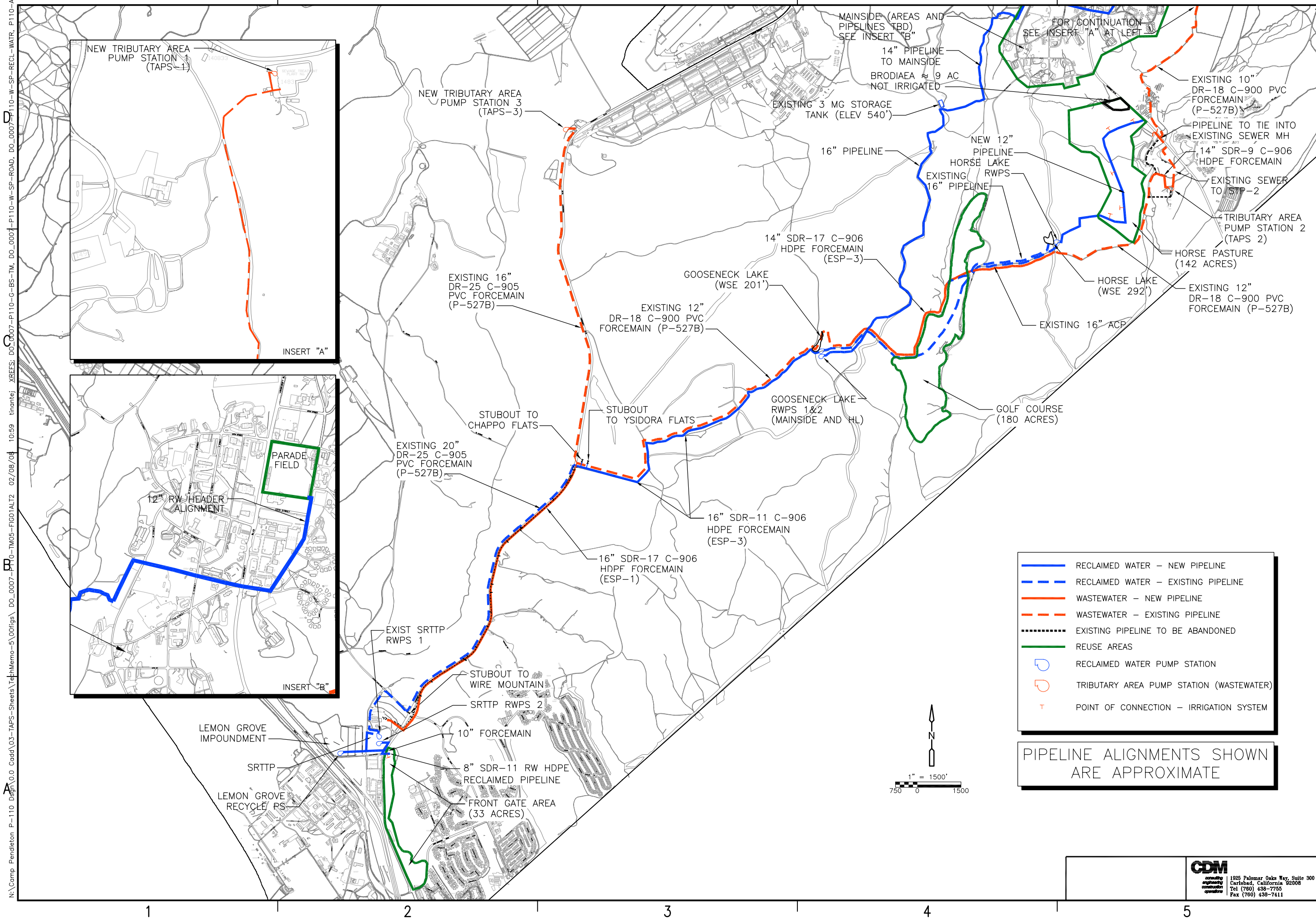
The recycle/reuse of the tertiary treated wastewater will be confined to within the boundaries of Camp Pendleton. There are no current plans to do otherwise. The treatment, operation and recycling are the responsibilities of the Facilities Maintenance Department (FMD), under the Assistant Chief of Staff (AC/S) Facilities, Camp Pendleton. There are no existing arrangements, past the Summer 2008 for any entity other than the Base to run the treatment and operations of the SRTTP.

1.5 Coordination of Reuse-Related Activities

In 1996, CDPH and the State Water Resources Control Board (SWRCB) signed a Memorandum of Agreement on the use of recycled/reused water that describes procedures for issuing water reclamation requirements and for resolving conflicts between CDPH and the RWQCB.

If CDPH and a RWQCB disagree on proposed water reclamation requirements or waste discharge requirements for a water recycling project, the RWQCB will follow the conflict resolution process prescribed in the 1996 "Memorandum of Agreement

between the Department of Health Services and the State Water Resources Control Board on the Use of Reclaimed Water."



APPR	DATE	DESCRIPTION	NO.

NAVFAC

SEAL

SUBMITTED BY	
JOHN M. PRICE	DATE
APPROVED	
ACTIVITY-SATISFACTORY TO	DATE
APPROVED	
FOR COMMANDER NAVFAC	DATE
DES	DR
CHK	QC
DESIGNER OF RECORD	
REVIEWED BY	
QC	
PROJECT MANAGER	
FIRE PROTECTION	

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND
SAN DIEGO, CALIFORNIA

SOUTHWEST DMSION
P-110 (CONVY)
CONVEYANCE/RECLAMATION
MARINE CORPS BASE - PENDLETON

OVERALL CONVEYANCE SYSTEM PLAN

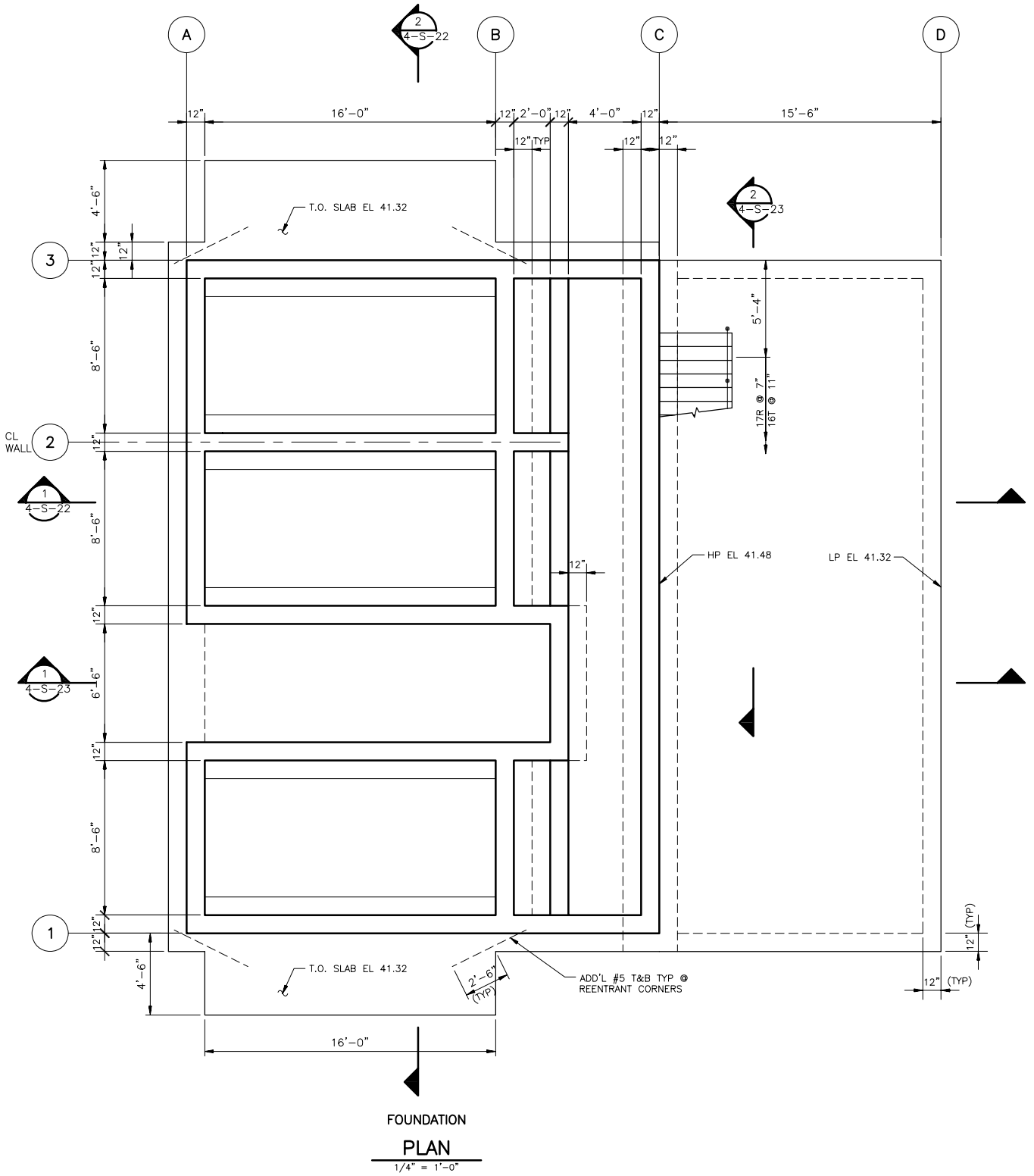
CODE ID. NO. 80091	SIZE D
SCALE:	
STA. DWG. NO.	
STA. PROJ. NO.	
SPEC. NO.	
CONSTR. CONTR. NO.	N68711-04-D-5110-007
NAVFAC DRAWING NO.	
SHEET OF	

CDM
consulting engineering construction operations
1925 Palomar Oaks Way, Suite 300
Carlsbad, California 92008
Tel (760) 438-7755
Fax (760) 438-7411

FIGURE 1-1

DRAWFORM REVISION: 15 MARCH 2004

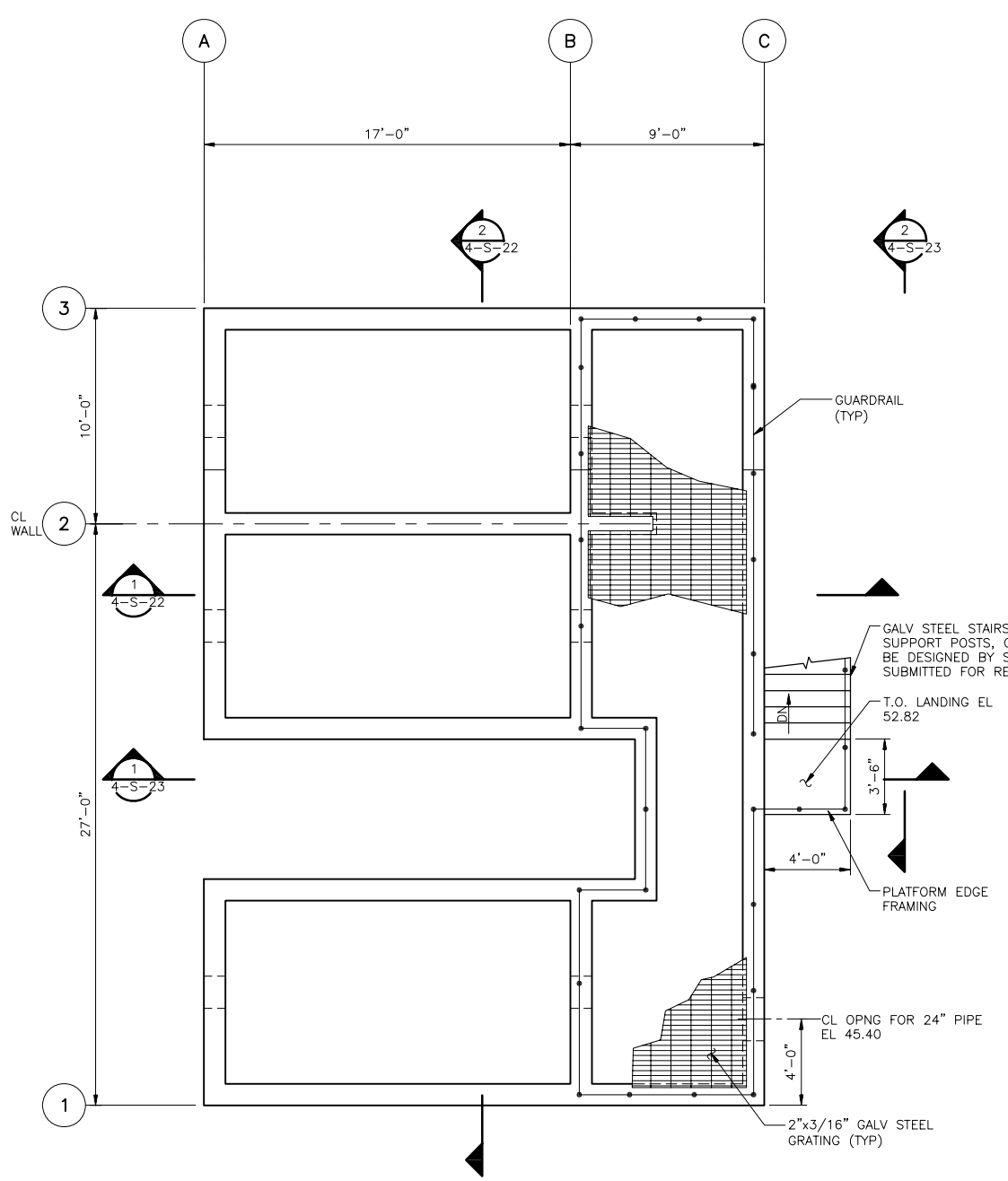
N:\Camp Pendleton P-110 Dsgn\0.0 Cadd\03-TAPS-Sheets\TechMemo-5\00figs\ DO_0007-P110-TM05-FIG01ALT2 02/08/08 10:59 tinantej XREFS: DO_0007-P110-G-BS-TM, DO_0007-P110-W-SP-ROAD, DO_0007-P110-W-SP-RECL-WATR, P110-ALIGN



FOUNDATION

PLAN

1/4" = 1'-0"



TOP

PLAN

1/4" = 1'-0"

N

1/4" = 1'-0"

2 1 0 2 4

DATE	APPR
9/14/06	WC
5/25/05	BCA

DESCRIPTION	INIT
AS-BUILT CONDITIONS SHOWN - REV 0	STM
APPROVED FOR CONSTRUCTION	

NAVFAC

SEAL

SUBMITTED BY
KELLENE BURN-ROY
DATE 5/25/05

APPROVED
ACTIVITY-SATISFACTORY TO
DATE

APPROVED
FOR COMMANDER NAVFAC
DATE

DES	PXN	DR	WKT
CHK	DPO	QC	WC

DESIGNER OF RECORD BCA
REVIEWED BY CHUEN-SHIOW CHEN
QC WAIN COOPER
PROJECT MANAGER KBR
FIRE PROTECTION

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND
SAN DIEGO, CALIFORNIA
SOUTHWEST DIVISION
FY04/05 MCON PROJECT P-002/P-002A
TERTIARY TREATMENT PLANT
AT
MARINE CORPS BASE CAMP PENDLETON
DISK FILTERS PLANS

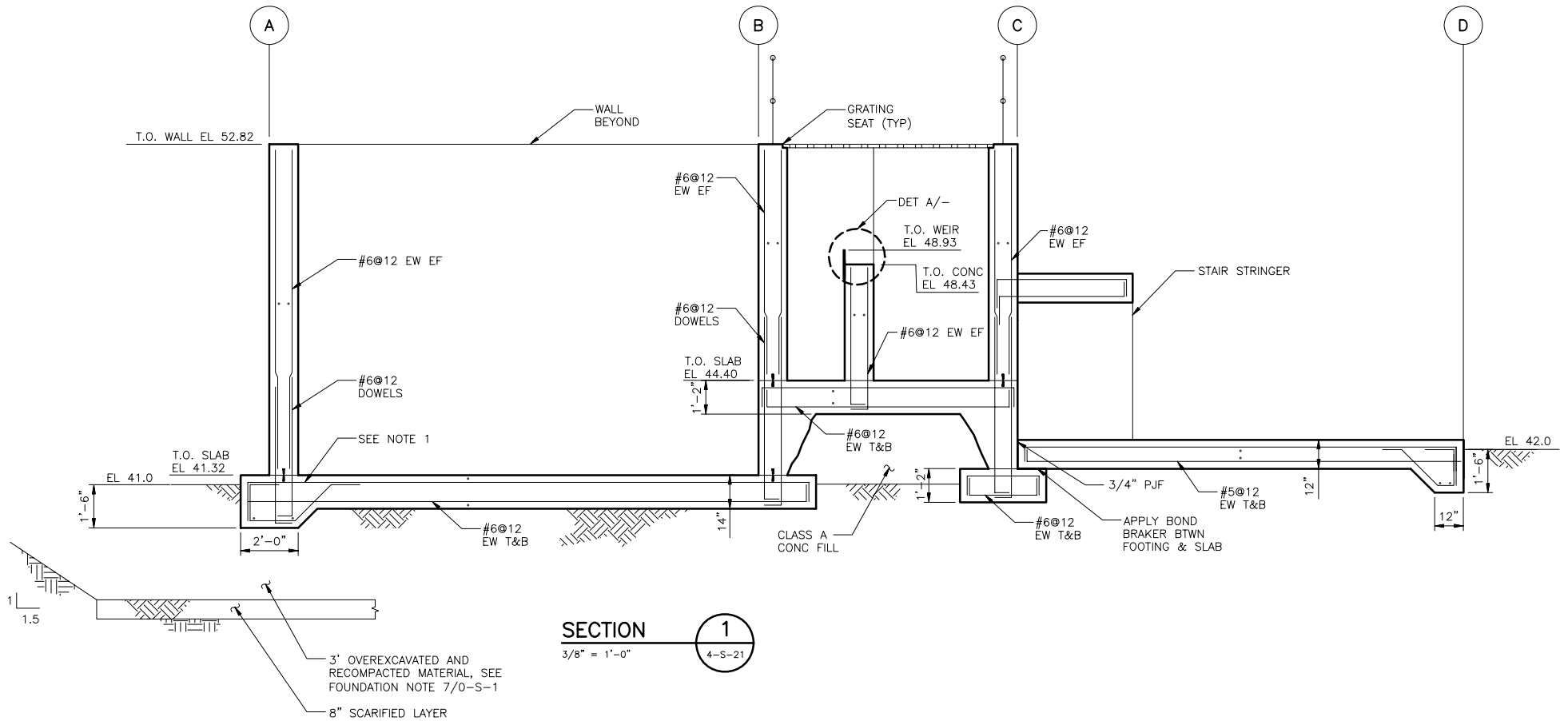
CODE ID. NO. 80091	SIZE D
SCALE: 1/4" = 1'-0"	
STA. DWG. NO.	
STA. PROJ. NO.	
SPEC. NO.	
CONSTR. CONTR. NO.	N68711-04-D-5110
NAVFAC DRAWING NO.	8229246
SHEET	OF XXX

4-S-21

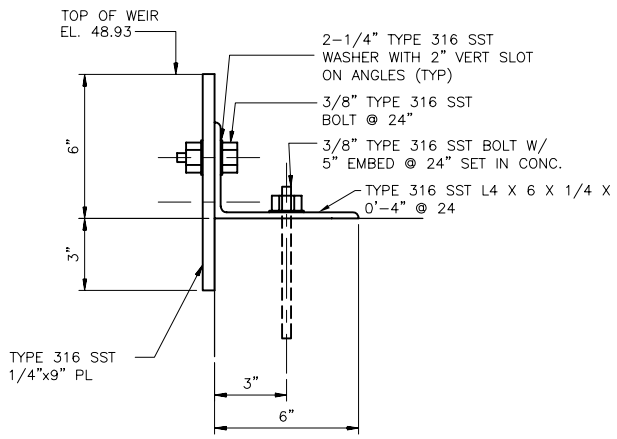
DRAWFORM REVISION: 15 MARCH 2004

RECORD DRAWING

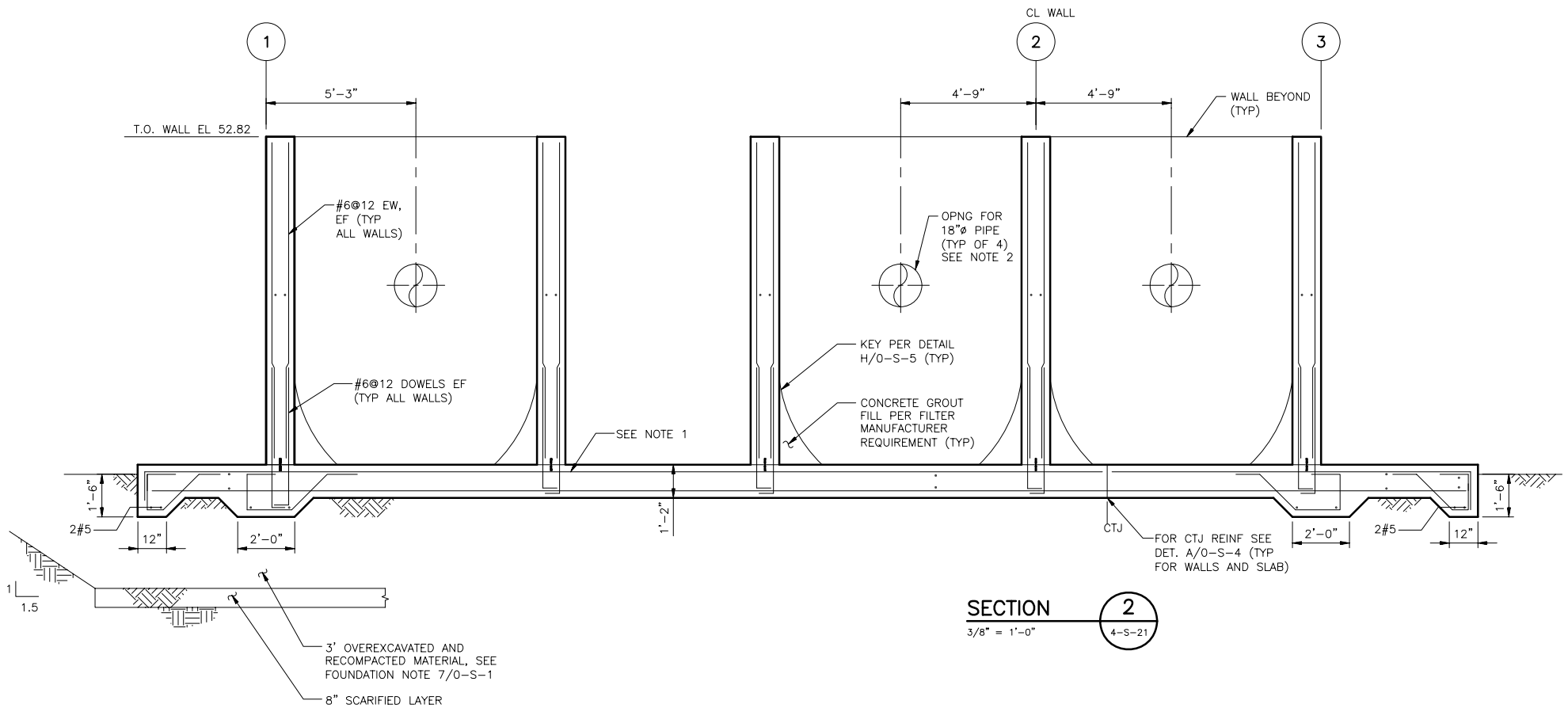
CDM
consulting engineering construction operations
1925 Palomar Oaks Way, Suite 300
Carlsbad, California 92008
Tel (760) 438-7755
Fax (760) 438-7411



SECTION 1
3/8" = 1'-0"
4-S-21



DETAIL A
3" = 1'-0"
-



SECTION 2
3/8" = 1'-0"
4-S-21

NOTES:

1. TOP BARS SHALL HAVE 2" CLR TYP. TRANSITION TO 3" CLR WITHIN 24" OF WALL/SLAB JOINT WITH WATERSTOP.

2. VERIFY LOCATION OF PIPE PENETRATIONS WITH MECHANICAL DRAWINGS.

RECORD DRAWING

DESCRIPTION	DATE	APPR
AS-BUILT APPROVED FOR CONSTRUCTION - REV 0	9/14/06	WC
	5/25/05	BCA
-		STM

NAVFAC

SEAL

SUBMITTED BY
KELLENE BURN-ROY
DATE 5/25/05

APPROVED

ACTIVITY-SATISFACTORY TO
DATE

APPROVED

FOR COMMANDER NAVFAC
DATE

DES	PXN	DR	WKT
CHK	DPO	QC	WC

DESIGNER OF RECORD BCA
REVIEWED BY CHUEN-SHIOW CHEN
QC WAIN COOPER
PROJECT MANAGER KBR
FIRE PROTECTION

CDM
consulting engineering construction operations
1925 Palomar Oaks Way, Suite 300
Carlsbad, California 92008
Tel (760) 438-7755
Fax (760) 438-7411

NAVAL FACILITIES ENGINEERING COMMAND
SAN DIEGO, CALIFORNIA
DEPARTMENT OF THE NAVY
SOUTHWEST DIVISION

FY04/05 MCON PROJECT P-002/P-002A
TERTIARY TREATMENT PLANT
AT
MARINE CORPS BASE CAMP PENDLETON

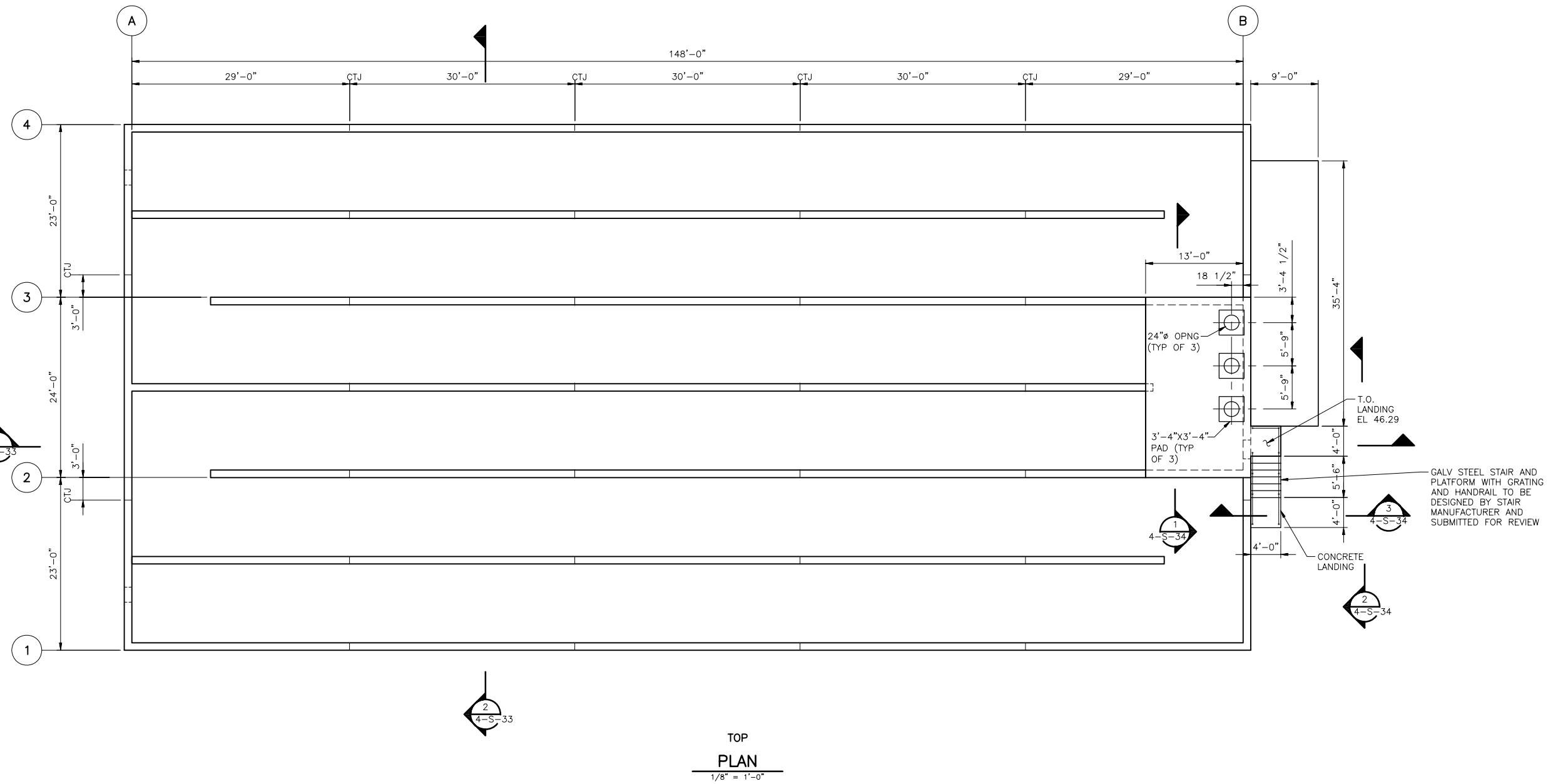
DISK FILTERS SECTIONS

CODE ID. NO. 80091 | SIZE D
SCALE: 3/8" = 1'-0"
STA. DWG. NO.
STA. PROJ. NO.
SPEC. NO.
CONSTR. CONTR. NO.
N68711-04-D-5110
NAVFAC DRAWING NO.
8229247
SHEET OF XXX

4-S-22

DRAWFORM REVISION: 15 MARCH 2004

N:\ACAD2000\4000\43575\P002\TERT-PLNT\05Stru\ p002-tert-plnt-04-s-22 05/19/05 10:46 nguyens XREFS: P002-TERT-PLNT-G-BS, P002-TERT-PLNT-S-SC-FILT



TOP

PLAN

1/8" = 1'-0"

N

1/8" = 1'-0"

4 2 0 4 8

	DESCRIPTION	DATE	APPR
	AS-BUILT	9/14/06	WC
	CHANGE STAIRS TO METAL	5/25/05	DPO
2	APPROVED FOR CONSTRUCTION - REV 0	3/4/05	BCA
-			STM

NAVFAC

SEAL

SUBMITTED BY

KELLENE BURN-ROY DATE 4/8/05

APPROVED

ACTIVITY-SATISFACTORY TO DATE

APPROVED

FOR COMMANDER NAVFAC DATE

DES	PXN	DR	WKT
CHK	DPO	QC	WC

DESIGNER OF RECORD BCA

REVIEWED BY CHUEN-SHIOW CHEN

QC WAIN COOPER

PROJECT MANAGER KBR

FIRE PROTECTION

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND
SAN DIEGO, CALIFORNIA

SOUTHWEST DIVISION

FY04/05 MCON PROJECT P-002/P-002A
TERTIARY TREATMENT PLANT
AT
MARINE CORPS BASE CAMP PENDLETON

DISINFECTION CONTACT BASIN TOP PLAN

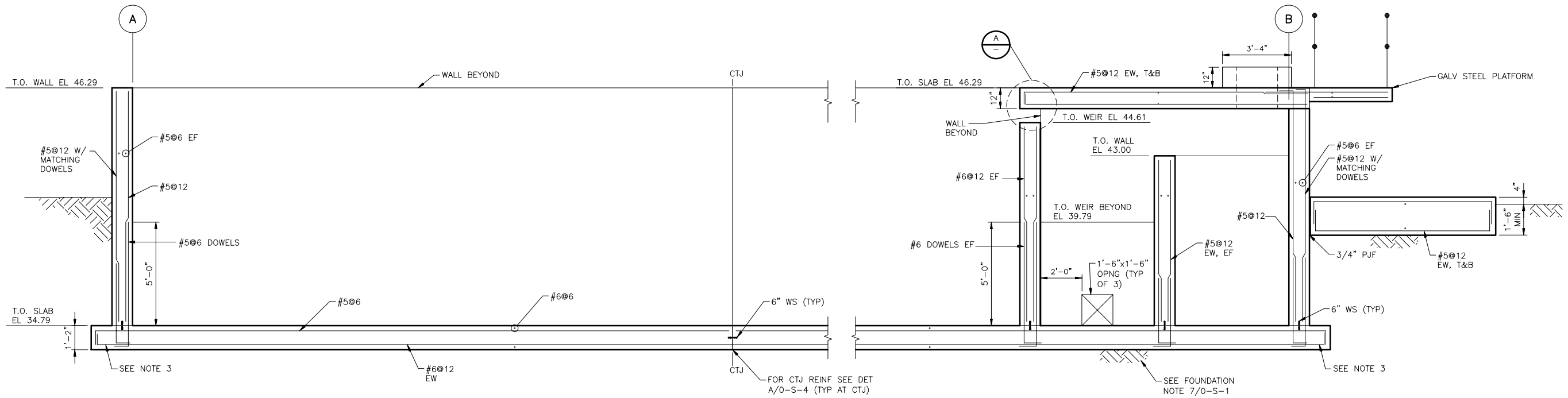
CODE ID. NO. 80091	SIZE D
SCALE: 1/8" = 1'-0"	
STA. DWG. NO.	
STA. PROJ. NO.	
SPEC. NO.	
CONSTR. CONTR. NO. N68711-04-D-5110	
NAVFAC DRAWING NO. 8229250	
SHEET OF XXX	

4-S-32

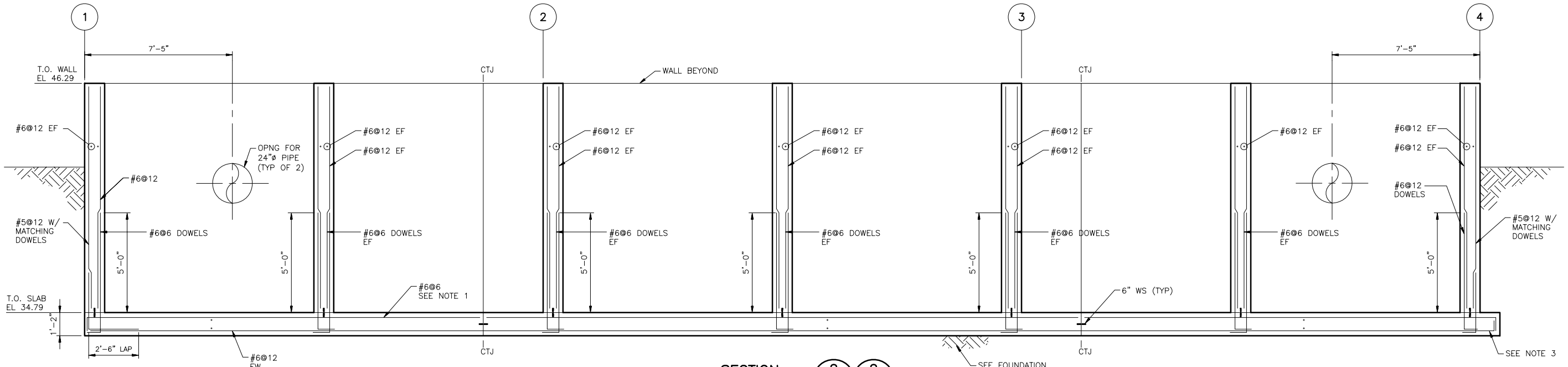
RECORD DRAWING

CDM
consulting
engineering
construction
operations
1925 Palomar Oaks Way, Suite 300
Carlsbad, California 92008
Tel (760) 438-7755
Fax (760) 438-7411

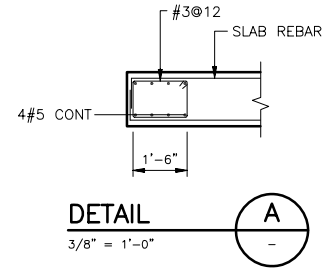
DRAWFORM REVISION: 15 MARCH 2004



SECTION 1 1 (4-S-31 / 4-S-32)
3/8" = 1'-0"



SECTION 2 2 (4-S-31 / 4-S-32)
3/8" = 1'-0"



DETAIL A
3/8" = 1'-0"

NOTES:
1. TOP BARS SHALL HAVE 2" CLR TYP. TRANSITION TO 3" CLR WITHIN 24" OF WALL/SLAB JOINT WITH WATERSTOP.

2. VERIFY LOCATION OF PIPE PENETRATIONS W/ MECH DWGS.

3. FOOTING EXTENSION MAY BE ELIMINATED AT CONTRACTORS OPTION. IF FOOTING EXTENSION IS NOT USED, PROVIDE LONGER LAP AT OUTSIDE DOWEL BARS AS SHOWN AT LINE 1 ON SECTION 2.

RECORD DRAWING

3	AS-BUILT CONDITIONS SHOWN	WC	9/14/06
2	CHANGE STAIRS TO METAL	DPO	5/25/05
1	APPROVED FOR CONSTRUCTION - REV-0	BCA	3/4/05
-	DESCRIPTION	APPR	DATE

NAVFAC

SEAL

SUBMITTED BY
KELLENE BURN-ROY
DATE 4/8/05

APPROVED

ACTIVITY-SATISFACTORY TO
DATE

APPROVED

FOR COMMANDER NAVFAC
DATE

DES	PXN	DR	WKT
CHK	DPO	QC	WC

DESIGNER OF RECORD BCA
REVIEWED BY CHUEN-SHIOW CHEN
QC WAIN COOPER
PROJECT MANAGER KBR
FIRE PROTECTION

CDM
consulting engineering construction operations
1925 Palomar Oaks Way, Suite 300
Carlsbad, California 92008
Tel (760) 438-7755
Fax (760) 438-7411

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND
SAN DIEGO, CALIFORNIA
SOUTHWEST DIVISION
FY04/05 MCON PROJECT P-002/P-002A
TERTIARY TREATMENT PLANT
AT
MARINE CORPS BASE CAMP PENDLETON
DISINFECTION CONTACT BASIN SECTIONS I

CODE ID. NO. 80091 | SIZE D
SCALE: 3/8" = 1'-0"
STA. DWG. NO.
STA. PROJ. NO.
SPEC. NO.
CONSTR. CONTR. NO.
N68711-04-D-5110
NAVFAC DRAWING NO.
8229251
SHEET OF XXX
4-S-33

DRAWFORM REVISION: 15 MARCH 2004

\\Wlcsvr1\cad\ACAD2000\4000\45275\P002\03TERT-PLNT\05Stru\p002-tert-plnt-04-s-33 06/07/05 17:25 nguyens XREFS: P002-TERT-PLNT-G-BS, P002-TERT-PLNT-S-SC-CBSN, Co-dps-S, REV-0

2.0 RULES AND REGULATIONS

2.1 Procedures, Restrictions and Other Requirements

State statutes and regulations pertaining to the use of recycled/reused water in California can be found in the California Water Code (CWC), California Code of Regulations (CCR), and California Health and Safety Code. Water quality control plans (Basin Plans) may also contain the recycled/reused water use policy of individual RWQCBs.

Regulation of reclaimed water in California is governed by the RWQCBs and CDPH. The CWC establishes the SWRCB as the agency with primary authority for water reclamation. The SWRCB provides reuse plans and policy guidelines, while the RWQCBs establish regulations for specific projects.

Section 13521 of the CWC states that the CDPH will establish uniform statewide recycling criteria for each type of use of recycled/reused water where the use involves the protection of public health. These criteria appear in the California Code of Regulations, Title 22, Division 4, Chapter 3. Additional design criteria appear in the California Code of Regulations (CCR), Title 17, Division 1, Chapter 5.

State Policy for Water Recycling

It is State policy to promote the use of recycled/reused water to the maximum extent possible to supplement existing surface and ground water supplies and to help meet water needs (CWC sections 13510-13512). One of the primary conditions on the use of recycled/reused water is protection of public health (CWC sections 13521, 13522, 13550(a)(3)).

Regional Water Quality Control Board Water Recycling Requirements

All persons who recycle or propose to recycle water and who use or propose to use recycled/reused water must file a report with the appropriate RWQCB (CWC section 13522.5). If an RWQCB determines that it is necessary to protect public health, safety, or welfare, it may prescribe water recycling requirements where recycled/reused water is used or proposed to be used (CWC section 13523).

California Department of Public Health and the Division of Responsibility

The RWQCBs must consult with and consider recommendations of the CDPH when issuing waste discharge/water recycling requirements (CWC section 13523). The CDPH is statutorily required to establish uniform statewide recycling criteria for the various uses of recycled/reused water to assure protection of public health where recycled/reused water use is involved (CWC section 13521). CDPH has promulgated regulatory criteria in Title 22, Division 4, Chapter 3, section 60301 et seq. of the CCR. CDPH regulatory criteria include specified approved uses of recycled/reused water, numerical limitations and requirements, treatment method requirements and performance standards. CDPH regulations allow use of alternate methods of

treatment in some cases, if the alternate methods are determined by CDPH to provide equivalent treatment and reliability.

2.2 Compliance Program

Reclaimed water will be used in compliance with Title 22, Division 4, Chapter 3, Article 3, Uses of Recycled/reused Water.

1. ***Tertiary Treated Effluent. T****reatment of wastewater will comply with Title 22 CCR, Section 60301.230 shall be disinfected tertiary recycled water. MCBCP will provide a chlorine disinfection process following filtration that provides a contact time, the product of total chlorine residual and modal contact time measured at the same point, value of not less than 450 milligrams-minutes per liter at all times with a modal contact time of aleast 90 minutes, based on peak dry weather design flow.*

2. ***Total Coliform Organisms****. Effluent total coliform organisms willnot exceed:*
   The median concentration of total coliform bacteria measured in the disinfected effluent does not exceed an MPN of 2.2 per 100 milliliters utilizing the bacteriological results of the last seven days for which analyses have been completed and the number of total coliform bacteria does not exceed an MPN of 23 per 100 milliliters in more than one sample in any 30 day period. No sample will exceed an MPN of 240 total coliformbacteria per 100 milliliters.

3. ***Turbidity.*** *Effluent turbidity will not exceed any of the following in accordance with Title 22, Section 60301.320: Does not exceed 2 NTU, the turbidity of the influent to the filters is continuously measured, the influent turbidity does not exceed 5 NTU for more than 15 minutes and never exceeds 10 NTU, and that there is the capability to automatically activate chemical addition or divert the wastewater should the filter influent turbidity exceed 5 NTU for more than 15 minutes.*

Excerpt from regulations for solids handling and disposal:

> *Management of all solids and sludge must comply with all applicable requirements of 40 CFR Parts 257, 258, 501 and 503; CWA Part 405(d), and Title 27, California Code of Regulations, including all monitoring, recordkeeping and reporting requirements. Since the State of California, hence the State and Regional Boards, has not been delegated the authority by the USEPA to implement the sludge program, enforcement of sludge requirements of CFR Part 503 is under USEPA's jurisdiction. Once sludge leaves a facility, it is subject to all applicable local, state and federal laws and regulations.*

2.3 Enforceable Rules and Regulations

In accordance with the requirements of the National Environmental Policy Act (NEPA) of 1969, 42 United States Code §§ 4321-4370d, as implemented by Council on

Environmental Quality regulations, 40 Code of Federal Regulations (CFR) Parts 1500-1508 and United States Marine Corps (USMC) Order P5090.2A, Chapter 12, dated July 10, 1998, Environmental Compliance and Protection Manual, the Department of Navy prepared the *Final Environmental Impact Statement (EIS) for the Tertiary Treatment Plant and Associated Facilities, MCBCP* (NAVFAC Southwest 2004b). The EIS was finalized in April 2004 with input from public and governmental organizations. Mitigation measures to be implemented during the project for the protection of environmental resources were presented in the EIS and accompanying Biological Opinion (BO). The primary cooperating agencies for this project were U.S. Environmental Protection Agency (EPA) and U.S. Fish and Wildlife Service (USFWS), but MCBCP also coordinated with U.S. Army Corps of Engineers (ACOE), RWQCB, California Coastal Commission, and CDPH.

NEPA documentation and permits, such as the 401/404 permits and air permits, were followed during the design, construction, operation and maintenance of the SRTTP and conveyance system.

A Final Supplemental Environmental Assessment (EA) was also prepared and finalized and approved by USFWS, State Historic Preservation Office (SHPO) and the ACOE on June 6, 2007. This document evaluates the potential environmental impacts of design changes and additions to the proposed action discussed in the EIS.

MCBCP also has an ACOE Nationwide 404 permit and a 401 permit from the RWQCB for the Wastewater Conveyance Project.

Major design criteria, applicable codes, and regulations were considered by each engineering discipline throughout the design of the SRTTP and conveyance system. The following is a listing of some of the key design criteria:

- Design complies with the "A-E Guide," January 2000, Naval Facilities Engineering Command (NAVFACENGCOM).
- The project sites and facilities are designed to meet the relevant requirements of the Occupational Health and Safety Administration (OSHA).
- Structural design is based on the 2003 International Building Code (IBC). Where seismic loads in the 2001 California Building Code (CBC) are more stringent, they were used for design.
- The wastewater and reclaimed water systems use technologies accepted by the CDPH, Division of Drinking Water and Environmental Management, for Title 22 water recycling, as documented in their publication "Treatment Technology Report for Recycled Water."
- Wastewater force mains and reclaimed water pipelines conform to the latest appropriate American Water Works Association (AWWA), American Society for

Testing and Materials (ASTM), and American National Standards Institute (ANSI) standards covering pipeline materials, appurtenances, and construction methods.

- Project facilities are designed to comply with the requirements established by the RWQCB, San Diego Region as set forth in the National Pollutant Discharge Elimination System (NPDES) permit and other permits and/or Waste Discharge Requirements for the SRTTP.

- Building mechanical systems design is meeting or exceeding the requirements of National Fire Protection Association (NFPA) 820.

- The various system designs meet EPA reliability requirements for project facilities.

- The Standard Plans for Public Works Construction, American Public Works Association – Southern California Chapter and Associated General Contractors of California – Southern California Districts "Greenbook Committee" were utilized in the design.

- Applicable biosolids or sewage sludge standards specified in 40 CFR Part 503 are followed. The design basis for SRTTP is in compliance with requirements for "Class B".

Pertinent personnel involved in the reuse program are as follows:

Robert Pierce
Regional Water Quality Control Board
9174 Skypark Court, Suite 100
San Diego, CA 92123-4340
Phone number: (858) 627-3935

Mr. Shawn Sterchi, P.E.
California Department of Public Health
1350 Front Street, Room 2050
San Diego, CA 92101
Phone number: (619) 525-4492

The Regional Water Board is authorized to enforce the terms of this permit under several provisions of the Water Code, including, but not limited to, sections 13385, 13386, and 13387.

2.4 Ordinances, Rules of Service, Contractual Arrangements

The construction and operation of the 5 mgd, SRTTP and the new wastewater conveyance and reclamation system is in accordance with MCBCP's long-term wastewater compliance program as executed in the Water and Wastewater System

Combination Firm Fixed-Price/Indefinite Delivery Indefinite Quantity (IDIQ) Design, Build, Operate and Maintain (DBOM) Contract at MCBCP, CA for NAVFAC Southwest under Contract Number N68711-04-D-5110, dated April 1, 2004. However, ultimately MCBCP is responsible for treating and distributing the recycled/reuse water produced from the SRTTP.

3.0 RAW WASTEWATER

3.1 Chemical Quality, Average/Peak Values for SRTTP Influent

The attached process flow diagram (Figure 3-1) shows the monitoring points for SRTTP. A composite sampler upstream of the SRTTP monitors the influent wastewater quality; a flow meter at the IPS monitors the flow to the treatment plant. Effluent flow meters measure the tertiary treated effluent. An effluent turbidity and chlorine meter will measure the chlorine residual and turbidity in compliance with the California Title 22 requirements.

Wastewater flows and existing SRTTP influent and effluent characteristics are presented in Table 3-1.

Table 3-1
Flows and Influent Wastewater Characteristics

Flow (mgd)	
Annual Average	5
Maximum Month	7
Peak Day	10
Peak Hour (Hydraulic Peak)	15
BOD5 (mg/L)	260
TSS (mg/L)	385
TKN (mg/L)	45
TP (mg/L)	8
Oil & Grease (mg/L)	ND - 230
Secondary Effluent Quality Requirement (NPDES)	
BOD5 – Monthly Average (mg/L)	30
TSS – Maximum Month (mg/L)	30
Oil & Grease – Monthly Average (mg/L)	25
Reclaimed Water Quality Requirements/Title 22 Requirements	
TN – Maximum Month (mg/L)	No Limit
TP – Maximum Month (mg/L)	No Limit
Total Coliform (MPN/100mL) (Title 22 Requirement)	• 7-day median not to exceed 2.2. • No more than one sample to exceed 23 in 30 days. • No sample to exceed 240
Turbidity (NTU) (Title 22 Requirement)	• Not to exceed an average of 2 NTU within a 24-hour period • Not to exceed 5 NTU for more than 5% of the time within a 24 hour period • Not to exceed 10 NTU at any time.

3.2 Influent Oil & Grease Limit of 25 mg/L

MCBCP has been in discussions with the RWQCB to waive the influent oil and grease limit contained in NPDES permit CA0109347. MCBCP formally addressed concerns over the permit's influent oil and grease limit to the RWQCB in a letter dated April 26, 2006, which is attached as enclosure (1). Although the RWQCB has not formally reply to this correspondence, dialogue with RWQCB staff indicates they are open to reconsider the requirement. Consistent with enclosure (1), MCBCP requests that the RWQCB only impose effluent limitations for oil and grease for the reasons given in enclosure 1. Some of the rational is highlighted below:

* The influent oil and grease limit of 25 mg/L cannot be reliably met in an influent stream receiving wastes from domestic (i.e., residential units) sources: oil and grease concentrations in untreated domestic wastewater typically range from 50-100 mg/L[1]. STPs influent and effluent oil and grease data, from September 2003 through February 2006 and March 2006 through December 2007 are in enclosures 1 and 2, respectively.

* Camp Pendleton's wastewater treatment plants effectively reduce influent oil and grease levels to meet the effluent limits established in NPDES permit CA0109347.

* Camp Pendleton's source control program, as outlined in the following paragraph, is comprehensive enough to control excessive oil and grease levels in the treatment plant influent.

3.3 Source Control Program (Part D.1-Order No. R9-2003-0155)

The purpose of CPEN Source Control Pretreatment Program (SCPP) is to systematically identify, characterize, and where possible, eliminate the sources of pollutants that can interfere with or degrade the operation of the sewage treatment plants (STPs) or the sewage collection system. All non-domestic facilities with the potential to discharge oil & grease are equipped with oil water separators. These oil water separators are maintained, monitored and serviced on a regular basis.

A contractor (Potomac Hudson Engineering) conducts a quarterly site visit to identify wastewater sources, assess operations and practices, collect information and data on wastewater generation, and provide onsite training and guidance, including the distribution of SCPP posters and brochures that discuss proper use of wash racks and deep sinks.

The purpose of these site visits is to assess Oil Water Separator (OWS) operations, management and maintenance procedures. To achieve this objective, OWSs discharging to the sanitary sewer system are surveyed to assess whether they are properly designed, operated, inspected and maintained. To the extent possible, this

[1] Source: Metcalf and Eddy, Wastewater Engineering, 3d ed., New York: McGraw-Hill, Inc., 1991

survey also examines OWSs that are part of the closed-loop recycle systems or that discharge directly to surface waters.

In addition to OWSs that discharge directly to sanitary sewer, wash racks, grit chambers, pump stations, and OWSs that discharge to an oily waste collection and treatment system are also inspected.

On the basis of these site visits, the adequacy of these facilities and operations are determined, followed by recommendations and their implementations.

Industrial Waste Surveys (IWS) (D.2-Order No. R9-2003-0155)

The IWS survey at MCBCP is conducted on an annual basis in accordance with federal regulatory requirements and the NPDES permit issued by the RWQCB. This survey identifies and classifies industrial users discharging non-domestic wastewater into sewage treatment plants. This survey is an integral part of MCBCP's on-going source control program. An electronic copy of the latest IWS report is in enclosure 3.

Contract to Inspect and Clean Oil & Water Separators

MCBCP has an existing contract for periodic inspection of MCBCP oil & water separators. Under this contract, the contractor inspects a certain number of oil and water separators. Then, if needed they are cleaned out. If the test results indicate contaminants present above non-hazardous levels, the sludge is disposed off as hazardous waste. The liquid is filtered and then put back into the system.

The Base Environmental Coordinators

The Environmental Coordinators consists of environmental representatives from various commands on the Base. They meet once a month. Presentations on oil & grease in the sewage and best management practices to minimize their disposal from housing units, mess halls, and commercial installations are periodically discussed. The respective environmental coordinators pass the information on to their commands for implementation. MCBCP uses this forum for public education, awareness and their active participation from individuals.

Base Order for Food & Hospitality (D.7-Order No. R9-2003-0155)

Camp Pendleton Base Order 6280.2A is to provide Food and Hospitality activities with information and instructions on maintenance of grease traps, proper disposal of oily and greasy material, maintenance and monitoring of sewer systems, as well as to providing information on grease trap spill reporting.

Public Education for Housing Residents (D.3 -Order No. R9-2003-0155)

Camp Pendleton has a public education program that includes posters, flyers, and other educational material that is distributed to the base residents when they first move into the housing units. A public education program that includes posters, flyers, and other educational material that is distributed to the base residents when they first move into the housing units.

INFLUENT PUMP STATION

SCREENINGS WASHER COMPACTOR

INFLUENT SAMPLER

RAW SEWAGE

BAR SCREEN

BAR SCREEN

INFLUENT WET WELL

ALUM

VORTEX GRIT REMOVAL SYSTEM

GRIT COLLECTOR

GRIT COLLECTOR

GRIT

IW

IW

GRIT CLASSIFIER

D

D

GRIT

GRIT PUMPS

AIR

AIR

WAS PUMP

WAS PUMPS

AIR

AIR

WAS

WAS

WAS

SEQUENCING BATCH REACTORS

FLOW EQUALIZATION BASIN

FILTER FEED PUMPS

DISPOSAL

POLYMER

GRAVITY BELT THICKENER

AIR

BFP

BFP

PW

PW

DIGESTERS

AIR

FILTRATE

DIGESTED SLUDGE PUMPS

DECANT

COMBINED SIDESTREAMS

FILTER BACKWASH SLUDGE PUMPS

HYPOCHLORITE SOLUTION

POLYMER (FUTURE)

FUTURE STATIC MIXER

TO STORAGE/IRRIGATION

EFFLUENT SAMPLER

Cl_2 SAMPLE

PLANT WATER

OFF SPEC TANK

DISINFECTION CONTACT BASIN

HYPOCHLORITE SOLUTION

RECLAIMED WATER PUMPS

TURBIDITY SAMPLE

TO LEMON GROVE PONDS/ LEMON GROVE PUMP STATION

DISK FILTERS

CDM

Process Flow Diagram

Figure 3-1

C:\temp\SRTP\ FIG_3-1 02/08/08 11:35 tinantej

4.0 TREATMENT PROCESSES

4.1 Schematic of the Treatment Train

A schematic of the SRTTP Treatment Train (See previously referenced Figure 3-1) can be found following Section 3.

4.2 Treatment Process

Refer to Section 1.3 for details of the Treatment Process.

4.3 Filtration Design

Tertiary filtration is accomplished with disk filters housed in three concrete filter basins, each containing 12 disks. The filter's backwash function uses a pump that draws filter effluent through the filter cloth from the filtrate side of the cloth, thereby removing accumulated solids from the cloth surface. Filter backwash is discharged back to the IPS wet well. This filtration process produces reuse quality effluent and is an accepted filtration technology for California Title 22 applications. Aqua-Aerobics PA-13 Nylon Pile Fabric Cloth Media Filter will be used in accordance with the CDPH document Treatment Technology Report For Recycled Water dated January 2007.

The filter cloth inspection will be entered into the maintenance program from monthly inspections and yearly inspections. The filters will backwash every 180 minutes or when level differential is 0.833 feet. The influent turbidity will not exceed 10 NTU more than 5 percent of the time.

The filtration process must be complimented with a disinfection process which is compliant with Section 60301.230, Title 22, CCR. See Section 4.4 in this report for more information on the disinfection process.

Table 4-1 summarizes the basic design criteria for the Disk Filters.

Table 4-1
Disk Filters Criteria

Number of Filter Basins	3
Filtration Area, per disk	53.8 ft²
Filter Loading Rate, average annual flow	3.25 gpm/ft²
Filter Loading Rate, maximum day flow (one basin out of service)	6 gpm/ft²
Backwash Volume @ 5 MGD	120,000 to 160,000 gpd
Backwash Volume @ 10 MGD	225,000 to 300,000 gpd
Number of Drives per Filter	1
Drive Horsepower	¾ hp

4.4 Chemicals Used, Method and Degree of Mixing, Application Points, and Dosages

Sodium Hypochlorite Generation, Storage and Metering

Prior to the implementation of recycling, sodium hypochlorite will be used only intermittently to control algae growth within the SRTTP.

Starting in the Summer of 2008, sodium hypochlorite solution (0.8 percent solution) for disinfection will be generated on-site using an electrolytic generation system. The system is designed to provide 28 days of salt storage and 5 days of hypochlorite storage. The feed system is sized to provide the dose required to achieve a chlorine residual contact time of 450 mg-min/L as required by California Title 22 regulations (assuming a minimum contact time of 90 minutes). The sodium hypochlorite will be controlled by the chlorine analyzer/flow meter at the head end of the Disinfection Contact Basin. The residual will be set to meet the required contact time of 450 mg-min/L. The chlorine residual will be measured before leaving the Disinfection Contact Basin to ensure proper disinfection. See Table 4-2 for more information on sodium hypochlorite generation and dosages.

A dye tracer test to show contact time will be performed before the Summer 2008 and the results submitted to CDPH while the SRTTP is running at normal flows. Increased flows may be measured by testing one basin at a time, then combining the results.

The transfer and storage tanks are equipped with external fill connections to allow filling with bulk sodium hypochlorite if the generation system is not operable or a stronger solution is required. Hydrogen gas generated from the solution preparation step will be off-gassed to the atmosphere through a positive ventilation system (fans).

Table 4-2
Sodium Hypochlorite Generation Criteria

Salt Storage Capacity (time)	28 days
Hypochlorite Storage Capacity (time)	5 day
Hypochlorite Transfer Tank Capacity	300 gal
Hypochlorite Storage Tank Capacity (each)	10,000 gal
Hypochlorite Storage Tank Number	2
Generation Capacity (Cl2 Equivalent)	600 ppd
Hypochlorite Concentration	0.8%
Metering Pump Capacity, each	658 gph
Metering Pump Capacity Dose (max)	30 mg/L

Alum Storage and Metering

As the Raw Wastewater is pumped from the IPS to the Grit Collectors, alum is injected to aid in phosphorous removal. The injection is done by either of two metering pumps. The dose rate will be based on raw wastewater flow rate and results of chemical analysis. Table 4-3 has more information on alum.

Alum is delivered to the site in liquid form and stored in a 5800 gallon fiberglass reinforced plastic (FRP) storage tank at the east end of the Chemical Storage and Handling area.

The pumps are controlled through local control panels and by the Supervisory Control and Data Acquisition (SCADA)/Human Machine Interface (HMI) system. The level of the storage tank is used in the HMI for indication and alarming only.

Table 4-3
Alum System Criteria

Storage Tank Capacity (process time)	12 days
Storage Tank Capacity	5800 gal
Metering Pump Capacity, each	600 gpd
Metering Pumps (duty)	1
Metering Pumps (standby)	1
Treatment Goal (ppm total phosphorous)	<1

Disinfection Contact Basins

During the operation of the plant, and prior to completion of the recycled water distribution system, the filtered effluent will not be chlorinated routinely, since discharges to the OOO cannot carry a disinfectant residual.

Upon completion of the Phase 2 conveyance and distribution pipeline component, the filtered effluent will be disinfected with sodium hypochlorite prior to distribution to reclamation areas. The disinfection contact basins will provide contact time between the filtered water and the sodium hypochlorite to allow for sufficient disinfection. Two disinfection contact basins, each sized for 5 mgd with a water depth of 10. 5 ft., will be provided to allow for a minimum effective contact time of 90 minutes See Table 4-4 below for more information.

Table 4-4
Disinfection Contact Basin Criteria

Number of Basins	2
Capacity, each	5 mgd
Pass Length	140 ft
Pass Width	10.5 ft
Water Depth	10.5 ft
Length to Width Ratio	40:1
Effective Contact Time	90 min

5.0 SRTTP RELIABILITY FEATURES (O&M)

The SRTTP reliability features will comply with Sections 60333 - 60355 of the Water Recycling Criteria. These sections of the Title 22 CCR contain the general requirements for design, alarm systems, treatment, and reliability. The treatment process is addressed in Section 4.0 of this report.

5.1 Alarm Systems

System Alarms

The HMI system will generate alarms from off normal conditions in the pumps, drives, and controls associated with the sodium hypochlorite generating and metering systems. Each alarm has a time delay to prevent nuisance alarms; each is latched and must be reset at the HMI and/or the MCC unless noted otherwise. There also are local alarms displayed on the field instruments and several local control panels.

The following critical alarms will be called when they occur:

- Generator running
- Power Loss
- Influent Pump Failed
- Influent Pump Station Lo-Lo Flow
- Influent Pump Station Hi-Hi Level
- Grit Pump Failure
- SBR No. 1 Failed
- SBR No. 2 Failed
- SBR No. 3 Failed
- SBR No. 4 Failed
- SBR No. 5 Failed
- Surface Aerator Failed
- Alum Pump Failed
- NaOCL Pump Failed

- Digester Hi Level
- EQ Basin Hi-Hi Level
- Filter Feed Pump Failed RW Pump Failed
- RW Wetwell Hi-Hi Level
- Disk Filter Hi Level
- Turbidity High Level – (Effluent from the EQ Basins cannot be diverted from going through the filters, but the effluent can be deverted after the filters prior t o the OOO).
- NaOCL Low Residual level
- Off-Spec Valve Open
- RW Valve Closed

SRTTP Emergency Operations

Emergencies at the SRTTP can be classified as system or equipment condition alarms, loss of power, fire, and upsets in the processes' biological and chemical balance.

The key to properly responding to condition alarms is to understand the various mechanical, electrical and control components in each of the systems, how they relate to each other, and what part each plays in the process.

During a loss of electrical power, the operator must recognize that while the HMI control system will continue running on Uninterrupted Power Supply (UPS), local control panels and all components such as pumps and drive motors will stop. The components that were running in Local Manual mode will have to be manually restarted. The components that were aligned to run under remote control of the HMI will be sequentially restarted by the HMI if they were running when power was lost. Those components associated with the SBR process will automatically restart if they were running when power was lost.

The SRTTP does have fire alarm pull boxes, but there is not any programming tie-in with the alarm system. The personnel on-site at the time of an alarm would follow the site's fire response plan, which is part of the United Water Emergency Response Plan.

5.2 SRTTP Staffing Hours

The SRTTP is being staffed 7 days per week from 0700 to 1530 hours. The MCBCP local area network is routed into the control building and connects the site's SCADA system to the MCBCP Unity Room. The Unity Room is staffed 24 hours per day. Plant staff is on-call from 1530 – 0700 hours. The Unity Room is the backup. If the on-

call person does not return the call to the Unity Room to respond to an alarm, then the Unity Room calls the backup operator cellular phone.

5.3 Antiterrorism and Force Protection

The SRTTP is enclosed by an 8-foot high chain link fence to limit access by unauthorized personnel, primarily for general safety reasons and to minimize risk of accidents. The fence also serves to inhibit unauthorized persons from entering the site, and to minimize the potential for someone to introduce biological or chemical agents into the reclaimed water distribution system. All process areas and buildings are located inside the chain link fence perimeter. A 30-foot clear zone has been provided from the fence line to the control building (the only inhabited building) and to the disinfection contact basin to prevent unauthorized persons from tampering with or contaminating the finished water. Additionally, a 30-foot clear zone has been maintained from all structures that are inside the fence line to structures and areas of vegetation that are outside of the fence line. Site access is through a single location, a motorized gate at the northeast corner of the site. The SRTTP buildings do not incorporate antiterrorism features because there are fewer employees than the antiterrorism threshold and because of their setback from any roads.

To minimize the potential for damage caused by a parked vehicle bomb, parking for vehicles and maintenance trucks is at least 33 feet away from the control building. Truck access for dewatered sludge loading is provided at the south side of the Operations Building. Personal vehicle parking has not been provided near the operations building. Maintenance truck parking is possible near all buildings and structures except the control building. The site's roadway loops around the site to allow maintenance vehicle access to the process areas, and allow chemical and salt delivery trucks to exit the site by driving around the looped access road.

Manual locks are installed on all facility doors. The entrance gate is secured using a motorized gate with a keypad.

General

The design of the project facilities and site incorporates antiterrorism protection in accordance with the UFC, DoD Minimum Antiterrorism Standards for Buildings, UFC 4-1010-01, 31 July 2002. This includes maximizing standoff distances to keep potential threats as far away from facilities as possible.

Applicable Codes and Standards

This section outlines the primary documents that were used in designing antiterrorism and force protection for the facility. Where conflicts occurred between two or more of the documents presented, the Government was asked for clarification.

The following Codes and Standards govern the design of the facility:

- DoD Minimum Antiterrorism Standards For Buildings, UFC 4-1010-01, 31 July 2002

- DoD Instruction 2000.16, DoD Antiterrorism Standards, June 14, 2001
- DoD Handbook 2000.12-H, Protection of DoD Personnel and Activities Against Acts of Terrorism and Political Turbulence, February 1993

6.0 SUPPLEMENTAL WATER SUPPLY

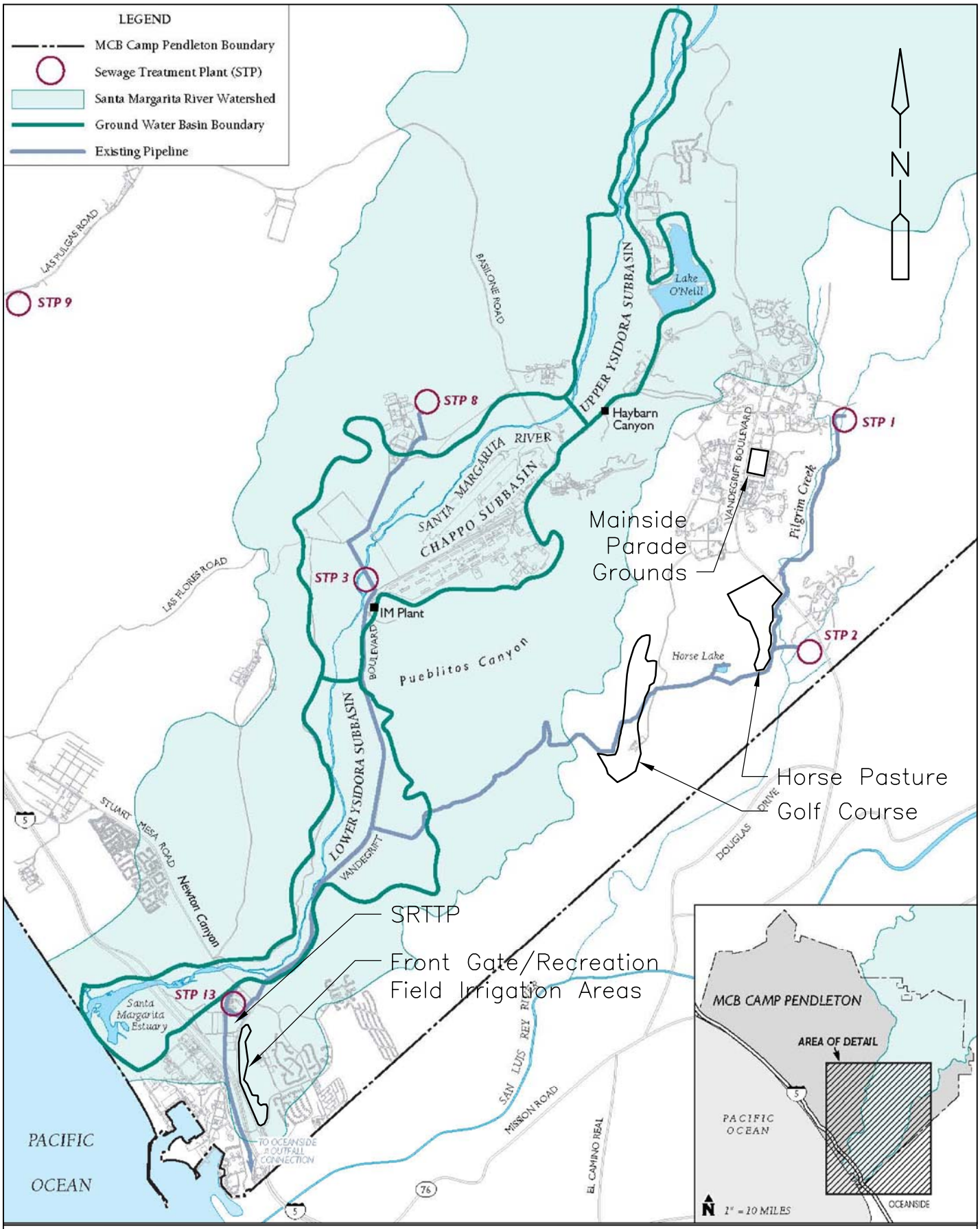
With the exception of San Mateo Point housing, which receives water from the South Coast Water District (SCWD), Camp Pendleton provides water to all areas of the Base through one of the following two water systems. Both of these water systems obtain water from underground aquifers or basins located on Camp Pendleton, and the water in both systems is disinfected prior to distribution to Base water consumers.

The water source for drinking water in the Southern part of MCBCP is groundwater from wells located in the Las Pulgas and Santa Margarita River basins. Presently, water from wells in the Santa Margarita River groundwater basin is processed at one of two iron and manganese removal facilities to reduce the concentration of these naturally occurring substances from the source water. See Figure 6-1 for the location of the Lower Santa Margarita River watershed and basin in relation to the Reuse areas.

MCBCP conducts water quality monitoring in both water systems in accordance with CDPH requirements. In addition to monitoring for contaminants with established regulatory standards, the Base also monitors for *unregulated contaminants*, which helps the USEPA and CDPH determine where certain contaminants occur and whether such contaminants need to be regulated. (See Table 6-2 for 2006 Water Quality Monitoring Results).

California DHS conducted an assessment of the MCBCP drinking water sources during July 2002. The assessment evaluated whether the Base's drinking water wells are vulnerable to contamination from activities that occur or have occurred on Camp Pendleton. The assessment determined that wells in both water systems are most vulnerable to activities commonly associated with *military installations*; however no contaminants related to this assessment category have been detected in the water supply. The assessment also determined that some wells in MCBCP's southern water system are most vulnerable to activities commonly associated with:

- Chemical/petroleum processing/storage and historic waste dumps/landfills based on contaminant detections in the groundwater source prior to July 2002.
- Airport maintenance/fueling areas and landfills/dumps. However, no contaminants related to these assessment categories have been detected in the groundwater source.



Lower Santa Margarita Watershed/Basin and Reuse Areas

CDM

Figure 6-1

Source: United States Marine Corps (USMC). 1997. Final Environmental Impact Statement/Report. Sewage Effluent Compliance Project, Lower Santa Margarita Basin. MCB Camp Pendleton, CA. San Diego County, California. April.

N:\Camp Pendleton P-002 O&M\8.0 Env Perm\01 NPDES Permit\OOCAD\ Fig_6-1 02/08/08 11:54 tinantej

2006 Water Quality Monitoring Results

Groundwater Monitoring

Primary Drinking Water Standards (Health Based) - Inorganics									
PARAMETER	Units	MCL	PHG (MCLG)	DLR	NORTH SYSTEM		SOUTH SYSTEM		Typical Source
					Average	Range	Average	Range	
Arsenic	ppb	10	0.004	2	ND	ND-2.4	ND	ND - 2.7	Erosion of natural deposits
Barium	ppm	1	2	0.1	ND	ND	0.027	ND - 0.140	Erosion of natural deposits
Fluoride (Natural-Source)	ppm	2	1	0.1	0.26	0.1 - 0.37	0.39	0.11 - 1	Erosion of natural deposits
Nickel	ppb	100	12	10	4	ND - 22	ND	ND	Erosion of natural deposits
Nitrate (as N03)	ppm	45	45	2	13.33	ND - 34.2	3.4	ND - 7.5	Fertilizer runoff; sewage; erosion of natural deposits
Nitrite as Nitrogen	ppm	1	1	0.4	ND	ND	0.07	ND - 0.630	Fertilizer runoff; sewage; erosion of natural deposits
Primary Drinking Water Standards (Health Based) - Radionuclides									
PARAMETER	Units	MCL	PHG (MCLG)	DLR	NORTH SYSTEM		SOUTH SYSTEM		Typical Source
					Average	Range	Average	Range	
Gross Alpha	pCi/L	15	(0)	3	ND	ND - 7.78	3.47	ND - 14.7	Erosion of natural deposits
Gross Beta	pCi/L	50	(0)	4	ND	ND - 4.67	ND	ND - 5.84	Decay of natural and man-made deposits
Uranium	pCi/L	20	0.43	1	2.83	1.25 - 4.71	3.35	ND - 13.2	Erosion of natural deposits
Secondary Drinking Water Standards (Consumer Acceptance Based)									
PARAMETER	Units	SMCL	PHG (MCLG)	DLR	NORTH SYSTEM		SOUTH SYSTEM		Typical Source
					Average	Range	Average	Range	
Sulfate	ppm	500	N/A	0.5	144	130 - 160	193	100 - 250	Runoff or leaching from natural deposits; industrial wastes
Unregulated Chemicals									
PARAMETER	Units	NL	PHG (MCLG)	DLR	NORTH SYSTEM		SOUTH SYSTEM		Typical Source
					Average	Range	Average	Range	
Boron	ppb	1000	N/A	100	181	230 - 150	176	110 - 251	Runoff/leaching from natural deposits; industrial wastes
Vanadium	ppb	50	N/A	3	ND	ND - 3.73	5.55	ND - 7.69	Naturally-occurring; industrial waste discharge
Other Parameters (Reporting required)									
PARAMETER	Units	MCL	PHG (MCLG)	DLR	NORTH SYSTEM		SOUTH SYSTEM		Typical Source
					Average	Range	Average	Range	
Sodium	ppm	N/A	N/A	N/A	73	67 - 83	120	98 - 150	Erosion of natural deposits
Total Hardness	ppm	N/A	N/A	N/A	280	260 - 288	382	276 - 460	Erosion of natural deposits
Total Organic Carbon	ppm	N/A	N/A	0.3	3.4	1.2 - 6.6	2.7	1.4 - 5.3	Erosion of natural deposits

Distribution System Monitoring

Primary Drinking Water Standards (Health Based) - Lead and Copper									
PARAMETER	Units	AL	PHG (MCLG)	DLR	NORTH SYSTEM		SOUTH SYSTEM		Typical Source
					90th percentile	# over AL	90th percentile	# over AL	
Copper (a)	ppm	1.3	0.17	0.05	*2.34 (b)*	*25 (b)*	ND	0	Internal corrosion of household plumbing systems
Lead (a)	ppb	15	2	5	ND	0	ND	0	Internal corrosion of household plumbing systems
Primary Drinking Water Standards (Health Based) - Microbiological Contaminants									
PARAMETER	Units	MCL	PHG (MCLG)	DLR	NORTH SYSTEM		SOUTH SYSTEM		Typical Source
					Detects	Violations	Detects	Violations	
Total Coliform Bacteria	N/A	(c)	(0)	N/A	1 (d)	0	2 (d)	0	Naturally present in the environment
Primary Drinking Water Standards (Health Based) - Disinfection By-Products									
PARAMETER	Units	MCL	PHG (MCLG)	DLR	NORTH SYSTEM		SOUTH SYSTEM		Typical Source
					Average	Range	Average	Range	
Haloacetic Acids	ppb	60	N/A	0.1	5.8	1.2 - 14	12.1	1.0 - 22	By-product of drinking water disinfection
Total Trihalomethanes	ppb	80	N/A	0.5	29	1.6 - 46	58.7	*2.0 - 110 (e)*	By-product of drinking water chlorination
Secondary Drinking Water Standards (Consumer Acceptance Based)									
PARAMETER	Units	SMCL	PHG (MCLG)	DLR	NORTH SYSTEM		SOUTH SYSTEM		Typical Source
					Average	Range	Average	Range	
Odor--Threshold	Units	3	N/A	1	1	*ND - 4 (f)*	1	*0 - 4 (f)*	Naturally-occurring organic materials
Iron	ppb	300	N/A	100	N/A	N/A	8	*ND - 608 (g)*	Leaching from natural deposits
Manganese	ppb	50	N/A	20	N/A	N/A	ND	*ND - 225 (g)*	Leaching from natural deposits
Turbidity	NTU	5	N/A	N/A	0.38	*ND - 5.1 (h)*	ND	ND - 4.64	Soil Runoff

June 2007

This table reflects drinking water contaminants that require mandatory reporting or were detected above a reporting detection limit. Contaminants detected above a regulatory standard are depicted in boldface italics.

Footnotes:

(a) Compliance for lead and copper is based on the 90th percentile of samples collected, which must be less than the regulatory action level. The system is out of compliance when more than 10% of the samples collected exceed the action level. Currently, semi-annual sampling occurs at 68 residences in the northern water system and 72 residences in the southern water system.

(b) As indicated, 25 samples collected from northern water system residences exceeded the action level for copper during 2006. Currently, Camp Pendleton is installing corrosion control treatment in both water systems to treat water which naturally tends to corrode residential plumbing.

(c) The MCL for total coliform is exceeded when more than 5% of monthly samples test positive in the southern water system and more than one monthly sample tests positive in the northern water system.

(d) Although a few routine water samples tested positive for total coliform in both water systems, neither system exceeded the MCL for total coliform, as mandatory confirmation sampling did not replicate any positive test results. Over 1200 water samples were collected and analyzed Base-wide to evaluate total coliform compliance during 2006.

(e) Ranges are based upon single sample results. Although one sample exceeded the MCL, compliance is based on the running annual average of quarterly sampling conducted at all sample sites, which complied with the health-based standard (i.e., MCL) for total trihalomethanes in drinking water.

(f) One sample in each water system exceeded the consumer acceptance-based standard (i.e., SMCL) for odor in drinking water. Camp Pendleton samples for odor monthly at 29 sites in the southern water distribution system and 15 sites in the northern water distribution system.

(g) Although water from most southern water system wells is treated at one of two iron and manganese removal facilities, iron and manganese can persist in the distribution system at levels above the consumer acceptance-based standards (i.e., SMCL) for these metals. During 2006, one sample exceeded the SMCL for iron and one sample exceeded the SMCL for manganese (among 29 sites sampled monthly in the southern water distribution system). Iron and manganese in southern water system wells comes from naturally occurring mineral deposits.

(h) One sample exceeded the consumer acceptance-based standard (i.e., SMCL) for turbidity in drinking water. Camp Pendleton samples monthly for turbidity at 15 sites in the northern water distribution system.

Abbreviations:

AL = Action Level
DLR = Detection Level for the Purposes of Reporting
MCL = Maximum Contaminant Level
MCLG = Maximum Contaminant Level Goal
N/A = Not Applicable
ND = None Detected
NL = Notification Level
NTU = Nephelometric Turbidity Units
pCi/L = picoCuries per liter
PHG = Public Health Goal
ppb = parts per billion = micrograms per liter (µg/L)
ppm = parts per million = milligrams per liter (mg/L)
SMCL = Secondary Maximum Contaminant Level

June 2007

Lower Santa Margarita Watershed/Basin and Reuse Areas

CDM

Figure 6-2

Source: United States Marine Corps (USMC). 1997. Final Environmental Impact Statement/Report. Sewage Effluent Compliance Project, Lower Santa Margarita Basin. MCB Camp Pendleton, CA. San Diego County, California. April.

7.0 MONITORING AND REPORTING

The SRTTP Reclaimed Water monitoring and reporting program will be determined by CDPH and RWQCB. Assumed effluent testing requirements are described in Section 7.2 below.

7.1 Monitoring Required by the Water Recycling Criteria

According to the Engineering Report Guidance from CDPH, the Engineering Report should describe the planned monitoring and reporting program, including all monitoring required by the Water Recycling Criteria, and includes the frequency and location of sampling. The continuous analyzers and recording equipment used, for measuring turbidity and chlorine will be calibrated weekly. The Hach turbidity meter will use the 1720 calibration kit. The Rosemount chlorine analyzer will use Hach method 10070 Chlorine, Total Ultra-high range.

7.2 Frequency and Location of Sampling

Liquid Effluent Requirements

The performance (treatment) requirements that the SRTTP must meet are tied to the quality of its liquid and solid effluents. The SRTTP's liquid effluent is discharged from the Disinfection Contact Basin.

Compliance testing and reporting will be coordinated between the SRTTP Operations staff and MCBCP Environmental Security.

Effluent Testing Requirements

The performance requirements for effluent quality are as follows:

1. Total Coliform: 7-day median not to exceed 2.2., no more than one sample to exceed 23 in 30 days, and no sample to exceed 240. Disinfected tertiary recycled water will be sampled at least once daily for total coliform bacteria. The samples will be taken from the disinfected effluent and will be analyzed by an approved laboratory.

2. Turbidity: Not to exceed an average of 2 NTU within a 24 hour period; not to exceed 5 NTU for more than 5 % of the time within a 24-hour period; and not to exceed 10 NTU at any time.

   Disinfected tertiary recycled water will be continuously sampled for turbidity using a continuous turbidimeter and recorder following filtration. Compliance with the daily average operating filter effluent turbidity will be determined by averaging the levels of recorded turbidity taken at four-hour internals over a 24-hour period. Compliance with turbidity pursuant to Section 60301.320(a)(2)(B) and (b)(1) will be determined using the levels of recorded turbidity taken at intervals of no more than 1.2 hours over a 24-hour period. Should the continuous turbidimeter and recorder fail, grab sampling at a minimum frequency of 1.2 hours may be substituted for a

period of up to 24 hours. The results of the daily average turbidity determinations will be reported quarterly to the regulatory agency.

3. Disinfected tertiary recycled/reused water suitable for irrigation of food crops, parks and playground, school yards, residential landscaping, and unrestricted access golf courses in accordance with the California Code of Regulations, Title 22, Division 4 Environmental Health, Chapter 3 Water Recycling Criteria, Sections 60301 et. seq with a Total Dissolved Solids (TDS) less than 1,200 mg/L.

4. Adherence to the Waste Discharge Requirements for United States Marine Corps Base Camp Pendleton Wastewater Treatment Plant Nos. 1, 2, 3, and 13, Discharge to the Pacific Ocean via the Oceanside Ocean Outfall, San Diego County.

5. Adherence to the "California Toxics Rule", 40 CFR Part 131.38, Establishment of Numeric Criteria for Priority Toxic Pollutants for the State of California.

Sampling and testing for constituents must be performed in order to determine if the SRTTP effluent is in compliance with the contractual and discharge permit requirements. All testing will be performed by a State of California certified laboratory. The test method is also provided for each constituent in the permit.

Samples will be taken from the effluent downstream of the disinfection basin. Test results are expected to be returned within two weeks after submitting effluent samples.

Constituents are separated into two parts:

- Performance: necessary for determining the SRTTP performance; includes BOD5, total suspended solids, total phosphorous, total nitrogen, pH, settleable solids, oil and grease, and chlorine.

- Compliance: necessary for determining if the effluent is in compliance with the waste discharge permit for recycling/reuse; includes metals, TDS, nitrate, turbidity, coliform, and toxics.

MCBCP will be responsible for the Performance Testing and Compliance Testing. Samples will be taken onsite from the installed automatic sampling stations.

8.0 CONTINGENCY PLAN

If the SRTTP is treating wastewater, it will not be shut down entirely. The SRTTP has been built with redundant equipment and process there is no need to divert raw sewage from the SRTTP.

8.1 Disposal or Treatment of Inadequately Treated Effluent

Effluent from the Disinfection Contact Basin that does not meet the minimum chlorine residual level of 3 ppm or exceeds an operator-set turbidity level, will be diverted to the Off-Spec Tank located north of the SRTTP, within the STP-13 boundaries. Residual levels below 3.0 ppm will be diverted to the Off-Spec Tank. Use of this "existing" 235,000 gallon tank will provide time and space for the SRTTP to continue operating while steps are taken to get the chlorine level under control, without violating the minimum chlorine residual level in the Reclaimed Water.

If the Off-Spec Tank is full, effluent would be diverted to Lemon Grove Ponds or Lemon Grove Pump Station.

8.2 Power Failure

During a loss of electrical power, the operator must recognize that most of the control system will continue running on Uninterrupted Power Supply (UPS) power, but that all components such as pumps and drive motors will stop; some will automatically restart and others will require manual restart after alarm acknowledgement. All the while, incoming wastewater flow will continue.

The motors and electrical components, which are powered from one of the MCCs, but controlled by the SBR Control Panel, will sequentially restart when power is restored. That panel's Program Logic Controller (PLC) system will monitor equipment condition/operations and restart everything as needed with 10 second delay between each.

The motors and electrical components, which are powered from one of the MCCs, but controlled by the SRTTP HMI, will be restarted via the HMI once power is restored.

9.0 TRANSMISSION AND DISTRIBUTION SYSTEMS

Wastewater, Reclaimed Water, and Water Pipelines

The wastewater conveyance system consists of approximately 2.2 miles of 16-inch diameter and 2.4 miles of 14-inch diameter high-density polyethylene (HDPE) pipeline. Beginning at an existing manhole at the SRTTP, the 16-inch pipeline traverses eastward, crossing Vandegrift Boulevard. Upon reaching the east side of Vandegrift Boulevard, the wastewater pipeline turns northward and is installed within the roadway at about 3-feet below ground surface (bgs) near the east edge of the outside, northbound traffic lane. Refer to Figure 1-1.

The wastewater pipeline continues northward within the eastern edge of Vandegrift Boulevard until reaching the intersection with El Camino Real, also known as the Ysidora Flats pipeline junction. At this location, the wastewater pipeline connects to an existing 12-inch polyvinyl chloride (PVC) force main beneath the west side of the road, which currently carries treated secondary wastewater from STP-1 and -2 to an overflow that sends effluent to Lemon Grove Pump Station when no reclaimed water is being used. This connection transfers wastewater flow alternately from the existing 12-inch force main to the new 16-inch force main and redirects the flow to the SRTTP.

In addition, the existing 16-inch diameter pipeline from STP-3 also connects to the new wastewater pipeline at the Ysidora Flats junction. New wastewater conveyance piping is also installed within an unnamed dirt road between Horse Lake and Gooseneck Lake connecting to an existing 12-inch gravity pipeline at Horse Lake and an existing 12-inch force main at Gooseneck Lake.

The reclaimed water irrigation sites include the Golf Course, Front Gate/Recreation Fields, Mainside Parade Grounds, and the Horse Pasture area. The new Lemon Grove Supply/Booster Pump Station, located near Lemon Grove Ponds, will pump reclaimed water directly to the Front Gate/Recreation Fields area.

The Horse Lake system, currently under construction will be completed in the Summer of 2008. It will be supplied by the effluent pump station at the SRTTP, which will pump reclaimed water to Gooseneck Lake. The reclaimed water will be boosted from Gooseneck Lake to Horse Lake by the new Gooseneck Lake Booster Pump Station, currently under construction. The reclaimed water irrigation sites that will be supplied from Horse Lake include the horse pasture and the Golf Course. MCBCP has ownership of all pipelines and associated facilities on Base.

10.0 USE AREAS

MCBCP has identified several areas that will be supplied with reclaimed water. The irrigation sites are presented in Figure 1-1. Table 10-1 summarizes acreage of irrigation sites, design and probable application rates, design and probable peak delivery rates, and irrigation cycles of all of the irrigation sites. Details concerning the reuse areas are located in Section 11.0 Irrigation. The table also indicates whether the irrigation site has an existing irrigation system or a new irrigation system has been installed.

Table 10-1
Reclaimed Water Irrigation Sites

Irrigation Site	Area (acre)	Application Rate (in/yr)		Delivery Rate (AF/yr)		Cycle (hr/day)	Irrigation System
		Design	Probable Peak	Design	Probable Peak		
Front Gate/Recreation Fields	34	43.7	60.0	124	170	16	New
Horse Pasture	142	43.7	60.0	517	710	16	New
Golf Course	180	64.2	64.2	963	963	8	Existing
Mainside Parade Grounds	18	43.7	60.0	66	90	8	Existing
Total	**374**						

* Each irrigation area is subdivided into zones which are irrigated in a sequence until the entire irrigation area has received water. The cycle time (hours/day) represents the total time required to irrigate all zones, that is the entire area.

Horse Pasture, the Golf Course and the Mainside Parade Grounds are outside the Santa Margarita Watershed boundaries. The front Gate/Recreational Fields are within the Santa Margarita Watershed boundaries; but there is no groundwater in the area. All the existing wells in the water basin are upgradient, in the northern sections of the basin. The closest drinking water well is about4.2miles, upgradient of this location.

10.1 Specific Type of Reuse Proposed

MCBCP is currently constructing two new reclaimed water irrigation areas at the Front Gate/Recreation Fields and the Horse Pasture areas utilizing the treated effluent discharged by the SRTTP. All irrigation areas are located on MCBCP which limits the access of all persons entering the property.

Reservoir 16151

Starting in the Summer of 2008, existing Reservoir 16151 will be utilized in the reclaimed water system based on its geographic location, elevation, and storage capacity. The reservoir is located on Reservoir Ridge, just northwest of the golf course. The capacity of the reservoir is 3 million gallons.

MCBCP is responsible for distribution and use of the recycled/reused water on Base. CDPH and the RWQCB have regulatory jurisdiction over the reuse sites. See Section 2.0 for more regulatory information.

11.0 IRRIGATION

Reclaimed Water Pipelines

New reclaimed water pipelines convey reclaimed water from the new reclaimed water pump stations to the various irrigation sites. In addition to new pipelines, sections of existing secondary effluent conveyance lines have been converted into reclaimed water lines and integrated into the new system. The new pipelines are sized and outlets provided for future expansion of the reclaimed water system.

In addition, smaller diameter irrigation distribution piping, valves, and appurtenances are also provided at the front gate and the horse pasture.

11.1 Irrigation Areas

Mainside Parade Grounds

The reclaimed water pipeline currently being constructed from Reservoir 16151 will convey reclaimed water by gravity to Mainside. The pipeline will connect to the existing irrigation system at the Parade Grounds along Vandegrift Blvd. (located between 13th and 14th streets). The Parade Grounds consist of the track and field, soccer field, and a large recreational field.

Front Gate/Recreation Fields

Reclaimed water will be supplied to approximately 34 acres of turf and landscaped areas near the front gate of MCBCP. The reclaimed water will be applied continuously at the design rate of 43.7 inches/year.

A new set of supply pumps located at the new Lemon Grove Recycle Pump Station is currently being constructed and will supply reclaimed water from the Lemon Grove Ponds to this area. A new irrigation system, including electrical and instrumentation, is also being installed at the Front Gate/Recreation Fields.

Horse Pasture

By the Summer 2008, reclaimed water will be supplied to irrigate approximately 142-acres of horse pasture near Horse Lake. The horse pasture area where brodiaea, an endangered species of SRTTP, was found will not be included in reclaimed water irrigation. Once the Engineering Report has been approved, the reclaimed water will be applied 16 hours/day at the design rate of 43.7 inches/year.

The new Horse Pasture Supply Pump Station is currently being installed adjacent to Horse Lake to supply reclaimed water from Horse Lake to the horse pasture. A new irrigation system including automatic controllers and backflows will be installed in early 2008.

Golf Course

Existing facilities will be used to apply reclaimed water to the golf course. The golf course is currently irrigated with secondary effluent from STPs 1 and 2 (pumped to Horse Lake for storage and distributed via gravity to the golf course).

The Horse Lake system, currently under construction, will be completed in the Summer of 2008. It will be supplied by the effluent pump station at the SRTTP, which will pump reclaimed water to Gooseneck Lake. The reclaimed water will be boosted from Gooseneck Lake to Horse Lake by the new Gooseneck Lake Booster Pump Station.

11.2 Method of Irrigation

A standard commercial spray irrigation system will be installed at the Front Gate/Recreation Fields and the Horse Pasture areas during early 2008. There is an existing spray irrigation system in place at the Golf Course and the Parade Grounds in the Mainside area.

11.2.1 Location of Domestic Water Supply Facilities

With the exception of San Mateo Point housing, which receives water from the SCWD, Camp Pendleton provides water to all areas of the Base through one of two water systems. Both of these water systems obtain water from underground aquifers or basins located on Camp Pendleton, and the water in both systems is disinfected prior to distribution to Base water consumers.

The water source for drinking water in the southern part of MCBCP is groundwater from wells located in the Las Pulgas and Santa Margarita River basins. Presently, water from wells in the Santa Margarita River groundwater basin is processed at one of two iron and manganese removal facilities to reduce the concentration of these naturally occurring substances from the source water.

11.3 Protection of Public

Approximately 22,000 feet of 16-inch to 24-inch existing PVC and ACP pipelines previously used to transmit secondary treated plant effluent were recently converted to transmit Title 22 reclaimed water. These lines were installed previous to the 1993 requirment for purple pipe or pipe wrapped with purple tape. As-built drawings of these lines are being updated to indicate they are reclaimed water lines.

Approximately 42,800 feet of 12-inch to 16-inch newly installed HDPE pipeline designed to transmit reclaimed water from Camp Pendleton's new SRTTP to reclaimed water pump stations and irrigation areas were identified and documented in the following manner:

1) Installation of 6-inch wide metallic-purple identification tape with the words "CAUTION: RECYCLED/RECLAIMED WATER LINE BURIED BELOW",

approximately one foot above the pipe along its entire alignment. This identification tape ensures that anyone excavating in any manner would expose the tape prior to damaging the pipe as a warning that the pipe contains recycle/reclaimed water.

2) A tracer wire was attached to the pipe along its entire alignment. This wire may be electrified to allow precise identification and location of the reclaimed water pipe in the field by utility locators or construction crews.

3) Surface features (air/vacuum valves, etc.) of the pipeline are painted purple for identification that a reclaimed water system is buried nearby.

4) A GPS survey was conducted after construction that obtained x, y, and z coordinates for the pipe alignment along the crown of the pipe and for any reclaimed water appurtenances within an accuracy of ± 0.1 foot. This information is provided to the Base in as-builts and is to be imported to the Camp Pendleton GIS system which maintains precise documentation and locations of all new utilities.

5) Installation of off-set signs indicating the location of the reclaimed water lines at 200 foot intervals.

All use areas where recycled/reuse water is used that are accessible to the public willbe posted with signs as stated in Section 116815, Health and Safety Code, and the requirements for use areas in accordance with Section 60310(g) of the Title 22 CCR. Each sign will display an international symbol similar to that shown in the Figure 11.1 otherwise known as Figure 60310-A.

The Lemon Grove Ponds Basins 1, 2, Reservoir 16151, and Horse Lake will be posted with signs that are visible to the public, in a size no less than 4 inches high by 8 inches wide, that include the following wording: "RECYCLED WATER – DO NOT DRINK – NO BODY CONTACT- NO WADING OR SWIMMING".

MCBCP will revise the recycled water distribution system maps to show the locations of the signs. MCBCP is a secure U.S Marine Corps Base and public access is limited.

Measures To Minimize Ponding and Runoff

The irrigation systems are programmed to control the application rates to avoid run off at any of the sites.

Site Containment Measures

The irrigation of the reuse areas will be on automatic timers. There will be no irrigation during any significant rain event. There are no drinking water wells or drinking water fountains in the reuse areas. . As discussed above, this is how the offset will be maintained.

Water Recycling Criteria

FIGURE 60310-A

MCBCP will follow Section 60310 of the CCR as it relates to groundwater water supply wells, see below:

> *(b) No impoundment of disinfected tertiary recycled water willoccur within 100 feet of any domestic water supply well.*
>
> *(c) No irrigation with, or impoundment of, disinfected secondary-2.2 or disinfected secondary-23 recycled water will take place within 100 feet of any domestic water supply well.*
>
> *(d) No irrigation with, or impoundment of, undisinfected secondary recycled water will take place within 150 feet of any domestic water supply well.*
>
> *(e) Any use of recycled water will comply with the following:*
>
> > *(1) Any irrigation runoff will be confined to the recycled water use area, unless the runoff does not pose a public health threat and is authorized by the regulatory agency.*
> > *(2) Spray, mist, or runoff will not enter dwellings, designated outdoor eating areas, or food handling facilities.*
> > *(3) Drinking water fountains will be protected against contact with recycled water spray, mist, or runoff.*

(f) No spray irrigation of any recycled water, other than disinfected tertiary recycled water, will take place within 100 feet of a residence or a place where public exposure could be similar to that of a park, playground, or school yard.

Protection Measures of Drinking Water Fountains/Outdoor Eating Areas

There are no drinking water fountains/outdoor areas at these recycle/reuse locations except the golf course. The golf is irrigated one section at a time. The timings of the golf course irrigation is such that there is no potential possibility of any direct human contact. The eating areas in the club house which is far from the irrigation areas and are located at a higher elevation than the golf course. There are no existing drinking water fountains in the irrigation areas and no plans to build any.

12.0 IMPOUNDMENTS

Reclaimed Water Storage

Seasonal storage is provided at the new Lemon Grove Ponds, sometimes referred to as impoundments. The ponds provide storage of reclaimed water during wetter months of low demand, and then provide water for irrigation during the dryer months. The new Lemon Grove Ponds consist of Basins 1 and 2. Basin 1 is currently being constructed from existing Pond 1 excavated to have more depth and therefore more storage capacity. Basin 2 includes existing Ponds 2 through 5 combined into one basin with a deeper basin bottom and more storage capacity. The total storage capacity of the new Lemon Grove Ponds, which consists of Basins 1 and 2, is 300 acre-ft.

The ponds are meant for storage of tertiary treated wastewater for reuse or discharge to OOO only, no other activities are permitted. Public access to the ponds is limited because of their location on MCBCP.

The following information requested in the Engineering Report Guidance document do not apply to the SRTTP: cooling, groundwater recharge, dual plumbed use areas, and other industrial uses. Tertiary treated water will be reused only for irrigation.

13.0 USE AREA DESIGN

13.1 Protection of Domestic Water Distribution Systems From The Recycled/Reused Water

There are no domestic water distribution systems in the recycle/reuse areas. The drinking water supply to the golf course club house is along the Golf Course Road which is elevated and is far from the area that is irrigated.

13.2 Designs to Minimize the Chance of Recycled/Reused Water Leaving the Designated Use Areas

The irrigation systems at the reuse areas are programmed to control the application rates to avoid run off at any of the sites. Also, there will be no irrigation during any significant rain event. There is no groundwater in the area and there are no drinking water wells. Also, there are neither areas nor drinking water fountains.

14.0 USE AREA MONITORING

14.1 Personnel in Charge of Monitoring and Reporting

The Facilities Maintenance Department (FMD) at MCBCP will be in charge of monitoring and reporting information concerning the Reuse Areas. However, responsibilities for reporting to the regulatory agencies will be handled by the Wastewater Branch, Environmental Security at MCBCP.

15.0 EMPLOYEE TRAINING

The SRTTP is rated a Grade IV wastewater treatment plant, which means the chief plant operator must have at least a Grade IV Certificate.

15.1 California State Training Requirements

Personnel who will be operating the SRTTP will be trained in accordance with the requirements in the most recent version of California Title 23. Specifically, "Title 23, Division 3, State Water Resources Control Board and Regional Water Quality Control Boards, Chapter 26, Classification of Wastewater Treatment Plants and Operator Certification".

15.1.1 Written Manuals of Practice

The following standards were used to develop O&M manuals. In addition, special circumstances and historical data, with consideration given to the standard maintenance procedures were also used. The following sources were used to develop the guides:

- Vendor manuals and references
- Maintenance Labor Standards as published by the U.S. Armed Forces, especially the Navy Engineered Performance Standard Public Works Maintenance
- Universal Maintenance Standards
- Input from experienced plant personnel to indicate a broad range of times for tasks and which are realistic for non-repetitive tasks.

The O&M Manuals are available for inspection at the SRTTP.